The Builder.

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FOR the last two or three weeks we have put aside the various letters which have reached us concerning the estimating system, the present mode of executing work, the position of builders, their oppression *by* architects, and their impositions *on* ditto. Need we say that these form a curious pile of contradictory import? One builder who wrote ten days ago, inclosing a list of tenders shewing a ruinous or knavish difference in the amounts (his being about the average) is pointed out, this week, by a second builder as being the lowest of nine in another matter, and 40 per cent. under the highest; an "Experienced Architect" shows that the most stringent clauses in a contract do not enable him to get his work done satisfactorily, unless the contractor be a respectable man; and a "Young Beginner" urges that it is shameful that he should be placed entirely at the mercy of architects, as he considers he is when forced to sign an undertaking to leave all matters in dispute to their decision. And while the latter, in continuation, complains that so few opportunities of tendering are afforded to young builders, in consequence of architects always sending to nearly the same set of men for estimates, instead of publicly advertising for tenders—another writer denounces altogether the system of tendering at a sum, makes various suggestions of too restrictive a tendency to be listened to in these times, and calls on the builders as a body to refuse to contract, excepting on a schedule of prices.* One thus answers another.

In the course of the last letter the writer says:—"It is very much to be regretted, that when builders have just had their eyes opened to the evil, and that most of our public boards have abandoned the system of contracting by the *lump*, as it is termed, the only board which for many years led the van in the improvement of the system of contracts in building has fallen back upon this old, and, I should hope, nearly expiring, system. I mean, with all due respect, the Board of Ordnance, under which for many years I have contracted by the schedule system, by which I could live; but now that the contract system of estimates has been introduced, as a respectable individual I must, amongst many others of the same class, give place to men of inferior pretensions, and who, it is beginning to be notoriously known in that service, are giving much inconvenience to the officers of the board."

Of the evil results of the present system no person acquainted with it can entertain a doubt,—construction, credit, and the morals of a large class are all injured by it to a fearful extent. The advance of skill in our operatives is prevented, the fair trader is made to look like a rogue, the uninformed builder is ruined, and the knavish one led to ruin others.

The extraordinary differences constantly to be observed can only be ascribed to error or fraud: look, for example, at one of the most recent lists of tenders submitted to us,—tenders for the erection of a parsonage house at Homerton, whereof the highest of nine was 2,173*l.*, and the lowest 1,286*l.** And what makes this the more extraordinary is, that the quantities, if we are rightly informed, were, as is often the case, supplied to all the parties; so that a main opportunity for mistakes was got rid of. Comment is unnecessary.

Again, look in our report (this week) of the proceedings of the Westminster Sewers' Commissioners, and it will be seen that, while one builder put down the sum of 1,112*l.*, as the cost of 1,825 feet of sewer, another undertook to do it for 779*l.* The number of bricks required to do a yard of this sewer, the quantity of lime and sand for mortar, the time occupied in laying the bricks, the extent of digging, and the positive cost of all these items, are as well known as that two and two make four; and yet, by some means or other, the tenders for executing a given quantity of the sewer run (in round numbers), 1,100*l.*, 1,000*l.*, 900*l.*, 850*l.*, and 780*l.*!

One of the letters, to which we are thus generally referring, made a statement to which we were not disposed in the first instance to give the slightest credit, as it reflected severely on the honour and honesty of a large body of men. It was to the effect, that when a limited number of builders are invited to send in, it is not unusual for them to agree among themselves as to who shall be the successful competitor, and then to send in merely nominal tenders, something over the amount named by the selected party. That this system is practised to any extent we cannot for one moment think; indeed, we can scarcely believe in isolated instances of it: but we have learnt with pain, from two builders of good standing, who mentioned the fact as if it were of such constant occurrence as scarcely to need concealment, that it was not unusual with them, when indisposed or unable to accept an invitation to tender, to learn the amount about to be sent in by one of the other parties who might be known to them, and forward a tender at a larger sum.

They could scarcely think that they were practising a gross deception on parties who trusted them, and that, carried to the extreme, they might be aiding to rob them,—that they were telling a mean lie, of which in any other shape we consider them incapable, believing that they not merely think

"Good name in man and woman, dear my lord,
Is th' immediate jewel of their souls,"

and so would preserve it in the ears of the world, but that they would be good for goodness' own sake, and in obedience to a High command.

Let them refuse to tender in competition if they please, and can afford it,—they shall have our praise for the refusal; but do not let them aid in making an architect believe that he has the conscientious opinion of several experienced men as to the cost of the works his employer requires—the price which each honestly puts upon his wares—when in reality he has nothing of the sort. Want of thought could alone lead right-thinking men to act thus fraudulently.

We have but opened the subject, and shall speedily return to it.

* The following are the suggestions alluded to:—

"1st. That the builders of localities should assemble at periods not exceeding once in every three months (having first held preliminary meetings, at which a stated schedule of prices should be framed, based upon calculations from the current prices of the day for each locality), these quarterly meetings being held with the view of altering such prices as the state of the markets, or other local circumstances may require.

2nd. That those prices be calculated so as to allow a fair living profit and per centage upon the outlay, and that they be classed in subdivisions of works exceeding certain sums; say, for instance, that works not exceeding 100*l.* value should be higher in the price of each particular item than works for 200*l.* or 500*l.*, and so on in proportion.

3rd. That the builders in each locality bind themselves not to work for less than the prices agreed upon by their locality, under penalty; but that they may propose to execute the works at any degree or amount of per centage above those prices of schedule which to them seem desirable.

4th. That all works executed by builders be measured and valued agreeably with the aforesaid schedule of the locality in which the work is performed, by a competent surveyor; and that in no case a system of estimating be permitted by the Union of the Craft, or whatever other term they may think fit to adopt.

5th. That a general central committee be appointed to watch over the interests of the trade, claiming from Parliament a power to restrain fraudulent builders or inexperienced persons from carrying on the mysteries of the craft."

* This is the list, and a startling one it is:—

Jay	£2,173
Lawrance	2,157
Skinner and Haynes	2,119
Nesham	2,075
Mansfield	2,060
Trego	1,958
Jeffrey	1,700
Curtis	1,697
Norris	1,687
Crook and Son	1,286

SOME ACCOUNT OF THE CATHEDRAL CHURCH OF S. MARIA DEI FIORI, AT FLORENCE;

*And Description of the Design for a New Elevation to the West End, by the Cavaliere Matas, Architect.**

THE very name of Florence excites a deep interest in the minds of all acquainted with Italian history or attached to the literature of classic Greek, or who are versed in the revival of letters on the banks of the Arno. The names of the Medici and of Dante, of Michael-angelo, Galileo, and Machiavelli, present themselves to one's view; and memory dwells upon the extent of the commercial relations of the merchant princes of the City of Flowers, or the skill, the intelligence and enterprise of her great men, and the desolating contests of the Guelfi and Ghibellini. The triple-arched bridge of the Trinity, which spans most gracefully the Arno, a miracle of science and taste; the fortress palaces of the Strozzi and Riccardi, her stupendous cupola of Sta. Maria dei Fiori, and the profusion of works of high art which embellish even her grand ducal piazza, announce a thinking, an art-cultivating and imaginative people, full of intense feeling.

Her metropolitan cathedral now alone claims our attention,—a worthy object for our consideration; for its vastness attests at once the noble piety of a generous and wealthy people, who could contemplate and at once undertake so gigantic an enterprise; and to its realization were consecrated the expanding genius of Arnolfo and Giotto, themselves lights in an age of artistic darkness, and the native science of the daring Brunelleschi, who, amidst the majestic construction of the temples and baths of ancient Rome, had, with a noble ambition, prepared himself for executing in his native city a cupola, which equals in size that of St. Peter's at Rome, and precedes it in date by a century and a half.

We will now proceed to the history and description of the church.

This cathedral is situated in the centre of a vast open space. In front of it and totally distinct, at a short distance, is the octagonal baptistery—an arrangement of usual occurrence in the earlier churches of various parts of Italy, and in imitation of the position of the baptistery of Constantine, near the Church of the Lateran at Rome. This relative position of the church and baptistery indicated that the neophite could only enter the church by baptism. Near the south-west angle of the nave is the exquisite campanile of Giotto—a perfect gem in design and execution, graceful in form and profuse in marble. This also is an usual arrangement, which exists most strikingly at Pisa.

It appears that there was an ancient cathedral church on the very same spot as the present, but in what style of art, whether of Italian Gothic as at Orvieto, or the Tedesco or German taste of Pisa, is not recorded. In 1294 the Florentine senate decreed that the old cathedral should be rebuilt, and in 1298 the works commenced under the direction of Arnolfo, who, however, died thirty-two years afterwards, and was succeeded by Giotto in 1334. Arnolfo was both an architect and sculptor, a combination of studies and occupations which has seldom if ever been successful. He apparently followed, in the nave, the usual Gothic arrangement, adhering possibly to the original plan of the old cathedral; but instead of the ordinary combination of transepts, we find a bold departure from previous practice by the introduction of a large octagonal vestibule flanked by three chapels, and surmounted by its enormous dome—a daring transition from established ideas to a new epoch.

For one hundred years these works proceeded gradually although slowly, for we find that it was not until 1376 orders were issued to commence the piers of the cupola; and at

* Read at the Institute of Architects, by Professor Donaldson, on the 15th inst.

the beginning of the fifteenth century the nave had been completed and covered in, and the central octagonal part had been carried up to the drum, immediately over the large arches, and the three large chapels domed in.

At this point a new period in the construction and character of the work commences. We will, therefore, for a while, examine particularly the work as far as it had then proceeded.

The plan consists of the nave, flanked on each side by a side aisle.

	FEET.
Total length from the west door to the further end of the church, within the walls	491·6
Total length of nave from the entrance-door to the arch of the octagon	260·0
The width of the nave between the walls	53·5
The height of the nave from the pavement to the ceiling	137·7
The internal width between the aisle walls	128·0
The total width of transepts between the walls	154·0
The piers are square, and in diameter	10·0
The inter-columnar space between the piers	52·0

There are three doors at the west end, leading respectively into the nave and side aisles; and there are two on each of the north and south sides leading into the side aisles. We may remark, that the piers consist of a group of four pilasters: from the two facing east and west in each pier, large pointed arches spring; but above the pilaster facing the nave another pilaster rises, surmounted by an entablature of peculiar design, above which spring the arches or groined domes that form the ceiling of the nave, having very much the appearance of a Gothic roof. In fact, the whole character of this part of the interior of the church bears a Gothic impress, modified by a certain sentiment derived from the monuments of antique art, which were the great objects of study of the artists of those days.

A noble arch leads from the nave to the octagon, and small yet still noble apertures on the axes of the naves lead from them into the octagon, also peculiar—a feature which this cathedral has in common with our own Ely Cathedral and St. Paul's of London. I may, perhaps, be permitted to call attention to this arrangement, by which the vista in the side aisles is uninterrupted, and the view of the spectator in the side aisle is carried at once into that important portion of a church—the very centre of attraction—under the dome.

Arrived under the centre of this imposing feature, we find chapels to the right and left, forming, as it were, transepts, and to the east another similar apsidal end, forming the other arm of the cross. Each of these polygonal chapels contain five smaller radiating chapels, with an altar in each. Two of the piers of the octagon are hollowed, to form robing-rooms, and in the other two piers are staircases to ascend to the cupola. The high altar is placed immediately under the centre of the dome, surrounded by a very cumbersome and inelegant screen of formal architecture, designed by Baccio d'Agnolo, another painter-architect.

The effect of the interior is extremely sombre,—not the dim religious light of the poet, but a heavy monotonous gloom. There is great poverty in the decorations, and bareness in the appearance of the walls. There are very few windows, quite insufficient to give that play of light and shade which is the great charm of our Gothic cathedrals. There is, in fact, in the building a deadness and chilling effect.

We now pass to the exterior. The east end has never been completed, and although faced up to a certain height, in the same style as the sides, the casing was subsequently removed, and the façade underwent various modifications, to which we shall have occasion hereafter to refer.

On the elevation of the northern aisle there are, from the N.W. angle up to the second pillar of the nave, a series of slightly projecting piers, with a succession of small windows, with an intermediate doorway. The windows are narrow and lofty, divided into two lights by a central twisted column, surmounted by a Gothic arch, above which rises a gable head, or species of canopy. The whole composition of this feature is fanciful yet elegant, presenting in the leading and general mass a Gothic sentiment, yet in the detail a capricious and irregular combination, at variance with its own primary style; twisted columns are used instead of buttresses, and are surmounted by buttresses, above which are crocketed finials. Instead of deep recessed reveals we have flat faces, and in lieu of sunk panels byzantine forms, indicated by mosaic or inlaid marbles in parquetted patterns, for which the Florentines have been ever famous.

The door also presents the same details and features—by no means deficient in grace. On each side of the square aperture there are slender twisted columns, the bases of which rest on lions. A square vertical buttress surmounts the columns, and has on its top a small statue. A two-centre pointed arch rises above the lintel of the door, fringed on the inner edge, and having a group, in the centre, of the Madonna and child, with an angel on either side. A truncated gable end rises over the arch crocketed, and on the truncated apex of the pediment is a niche with twisted columns, arched head, buttresses, finials, and crockets.

The plain face of the wall is thus divided: there is a kind of podium or dado as high as the aperture of the door, and level with the bottom of the windows; from this to the cornice it is divided into four heights of panels, not sunk, not moulded, merely indicated by the patterns of various coloured marbles; and as there are similar marble panels in the podium, there are in all five rows of these flat panels in the height. Then comes a species of cornice, indicated rather by its continuous horizontal lines than by any bold or projecting mouldings, for the mouldings are few, small, and without any material advance from the face of the wall. There is then a kind of attic, which is surmounted by another species of cornice, the projection of which is produced by machicolations, consisting of trefoil arches resting on corbels, above which is an impanelled parapet. Behind this attic is a flat roof, above which rises the clerestory similarly panelled, and with a series of large circular bull's-eye windows.

The same style of ornamentation prevails throughout the exterior along the aisle walls, as also around the polygonal chapels which flank the octagonal centre, here somewhat varied by the flying buttresses which counterpoise the thrust of the smaller domes of the polygonal chapels, and which polygonal chapels act as abutments to the drum of the great dome.

Considerable contradiction exists as to the date of the death of Arnolfo. It appears that the ceremony of laying the first or corner stone by the Cardinal Legate took place in 1295; Milizia and Quatremère de Quincy state that our architect died in 1300; Sgrilli in 1330; and the latter seems the more probable date, as it is acknowledged by all that he carried up the walls to a considerable height ere he died, and that he turned three of the arches of the great cupola. So great an advance in so gigantic an edifice could not have been accomplished in so short a period as five or six years, and particularly when we consider its slow progress until the time when Brunelleschi took it in hand—about 1410, or 115 years after the laying of the stone.

Let us for a moment, then, consider the style of decoration adopted in the exterior of this cathedral. It would appear that the object of Arnolfo was to give great breadth of effect to his façade. To avoid the established practice of the introduction of storeys of columns, one above the other, of small dimensions, as we find at Pisa and in other parts of Italy: he has abandoned the playful effects produced by the protruding buttresses of Gothic buildings, of which, however, there are few examples on that side of the Alps, and of which he was doubtless ignorant; and he did not avail himself of the varied outline produced by vertical pinnacles, finials, or other upshooting members rising above the line of cornice. Casting off the trammels of the rules of the fantastic style hitherto prevalent, and unacquainted with the severe refinements of classic art, which did not come into vogue until a century after his decease, he yielded apparently to his own feelings alone, and has produced an enormous but a timid and flat development of surface, mechanical and tame, devoid of bold and striking sentiment, and with a total absence of those dignified and impressive modifications of outline, chiaroscuro, and advancing and receding planes, which form the charm as well of Gothic as of classic art.

On the death of Arnolfo, Giotto was appointed to continue the work, in which he seems to have followed most strictly the design of the original architect, not only in the cathedral, but also in the campanile or bell tower, which he erected near the S.W. angle of the cathedral. It is, of the kind, the most beautiful production of the art.

The cathedral seems to have advanced very slowly after the death of Arnolfo. The nave was covered in, and the exterior of the side walls completed, as also the octagon and the polygonal chapels branching from it both on the outside and inside, and the octagon had been carried up to the general line of cornice, but the west end only presented a bare wall, partly faced with marble by Arnolfo, as high as the doors. Here there was a pause, for it was discovered that no one evinced sufficient capacity to undertake the addition of a dome to cover the vast central octagon of the cross. Many were the strange and senseless projects submitted to the trustees of the fabric. Some proposed a central pillar, from which radiated arches should be turned; others recommended that the space should be filled with earth mixed with coin, up to the required height, and that upon this centre the cupola should be turned, which done the people should be admitted to remove the soil, their labour being recompensed by the coin they should find in the load carried away.

In the mean time there was one moved by the powerful incentive of a noble ambition for distinction. He was cherishing the thought, that for him was reserved the splendid task of completing in a worthy manner the cathedral of his native city, which should out-eclipse every preceding erection. Laborious, determined, and endowed with a mechanical genius, he gave himself up to this achievement. He went through the drudgery of the first principles of the art. He looked around in vain for monuments, the taste and skill of which should be worthy models upon which to create a new epoch. Rome was then the El-Dorado of art. Her temples, her thermæ, her amphitheatre, her columns and triumphal arches, opened a new field of delight and instruction. Year after year Filippo Brunelleschi drew, measured, and deeply studied them; and again and again returned to the absorbing occupation. Disregarding time, labour, nay, the very food which should keep body and soul together, he denied himself the amusements and almost the necessities of life, in order to return to his dear Florence a worthy citizen, an accomplished architect of the proud republic.

The problem was at length solved in his mind, and he prepared a model, which, however, he prudently kept from the sight of all.

In 1407 Brunelleschi, on his arrival at Florence, found all parties in confusion, disputing the proper steps to be taken to complete the dome of the cathedral. He was consulted on the subject, and, without communicating the principal portion of his conception, he advised the trustees to construct a drum 38 feet high, pierced with eight circular windows, to give light to this portion similar to those already in other parts of the fabric. This suggestion was adopted and carried into effect, and as his fellow-citizens seemed hardly to value his capacity, he left them once more for Rome, in 1419, to reconsider his project, and compare its practical details with the construction of the baths and other ruins of that city. The curators of the cathedral and the government again called a meeting of the scientific men of all Europe to receive their ideas upon this absorbing question, at which Brunelleschi attended. One person suggested one means, another another, and each seemed more preposterous than the other, more senseless and impracticable. Brunelleschi alone was calm, but, without showing his model, stated that his idea was to construct without centering a double dome, with free passage between the outer and inner one, to allow people to pass all round, between the two. He was scoffed and derided, and urged to explain it further. This he refused. He was then accused of trifling with the authorities and other distinguished men around him, upon which, to gain their confidence, he adopted, according to Milizia, an illustration of his argument, attributed to Columbus a century after. He produced an egg, and challenged them to make it stand upright. This they said was impossible. He then took it, broke the end, and placed it on the table. "Ah!" said they, "we all could have done that." "Yes," said he, "when I have shown you how to do it;

and so you would say of my design for the cupola, were I to show you my model: appoint me your architect, and it shall be done." They then felt that he was capable of the great enterprise, and although the malice and envy of rivals still strove to crush the daring innovator, he was appointed in 1420; and when he died, in 1444, it was carried up to the cupolino, which was subsequently completed agreeably to his design.*

Up to this moment the façade of the west end has remained incomplete, and it appears so to have continued until Sansovino, about 1514, by the desire of Leo X., erected a false elevation of wood. It consisted of a lofty basement, surrounded by coupled Corinthian columns, with niches and statues for the Apostles, surmounted by a pediment, and interspersed with pictures by Andrea del Sarto—a strange medley, totally at variance with the spirit of the design of the rest of the building. This temporary structure at length threatened decay, or the citizens became disgusted with it, for we find that in 1586 a certain Benedetto Ugguccioni, the chief officer of the fabric, ordered it to be taken down, under the reign of Cosmo de Medici. Towards the end of that century Luigi Agoli produced a design for the front, which was much approved. About a half century afterwards, or towards 1650, Gherardo Silvani, a Florentine, designed another façade, which was approved but not executed.

On the occasion of the marriage of Ferdinando de Medici with a Bavarian princess, the whole of the west elevation was plastered over, and a scenic front painted by Bolognese artists, which still remains,—a shame to the city!

We may now consider the causes which contributed to the want of success in the able men who had devoted much time to give a fitting elevation to this noble building. Each one had mistaken the great principles which should guide an architect in the completion of a monument of art the production of another age, and having a distinct individuality of character of its own. If the great charm of an edifice of this sacred class be unity of conception, which should produce on the mind one continuous impression, free from those rude contrasts of feeling resulting from an incongruity of parts, the production of different epochs, with details of contradictory character, and as it were of contradictory sentiment, then it must be allowed that he alone rightly feels the subject who follows out the sentiment of the original type,—who imbues himself with the spirit of its general aspect and minuter decorations. It is true that the Gothic architects were not impressed with this conviction, and we find the additions to our cathedrals strongly contrasting with the original portions of the earlier epochs. This may produce picturesqueness, but in the educated mind there also arises a feeling of disappointment and dissatisfaction. So was it with Sansovino, Silvani, Pierratti, and the other artists who had given designs for this façade. They seem to have sought their own glory, not that of the building; they forgot the tribute due to the fame and the production of the original architect, Arnolfo, and thought only of themselves.

The Cavalière Matas, however, of our day, has more judiciously and more generously entered into the spirit of the task he has undertaken. He has felt, and felt truly, that he had to combine the baptistery and the tower (now disconnected by the incongruous front); and by the adoption of the original style, to complete the grouping and the picture in one sentiment: he has gone back to the thirteenth century, and imbued himself with the spirit which guided the first conception of Arnolfo, and with a happy success has reconciled incongruities, giving a finishing touch to the side elevations, and rendered what is now poor and meagre a noble and dignified idea.

The view which is before us presents the elevation of the west front, with a lofty central gable end, formed by the continuation of the clerestory of the nave, flanked by boldly projecting square piers or buttresses. This forms the middle portion. On each side are wings rising to the height of the general cornice of the building, and level with the flat roof over the side aisles, thus producing three simple grand divisions for the elevation. Each division has its entrance-door, above which rise the circular windows already existing in the present wall, and each of which is inclosed within a pointed arch. The doorways are of noble size, designed in the spirit of the ones on the side front by Arnolfo; and, in fact, the whole elevation is evidently a conception founded upon the proportions and details of the ancient doorways, modified as circumstances required.

But there is a departure,—or perhaps I should call it a carrying out,—of the original design, which gives animation and movement to the composition: it is that he has surmounted the angular square buttresses with noble niches or tabernacles, crowned by pinnacles, and has repeated them along the flanks of the building. This relieves the outline, hitherto tame, and gives variety to the grouping. The apex of the pediment is also terminated by a cross and group of angels, and the inclined cornice of the gable end is fringed with foliage, thus softening the hardness of the architectural lines. The faces of the buttresses are relieved by niches filled with statues.

By these modifications the Cavalière Matas has most judiciously satisfied the requirements of the difficult programme. He has retained all the leading features of the original building, and restored its upshooting character. He continues the lines of the cornices, and repeats the divisions of the panelling; but, in addition to this, he has given greater projection to the angular buttresses, and by introducing the side doors in recesses, and by giving greater depth to the reveal of the central door, and the adoption of the tabernacular niches above the cornice, he superadds a spirited movement in the lines, and marks more decidedly their vertical tendency akin to that of the tower. He throws in a depth and variety of chiaroscuro, and accomplishes this with wonderful propriety, without departing from the individual character of the original.

The genius of Arnolfo is thus vindicated;—that which hitherto seemed an impossibility has been realized. The cathedral of Florence may be finished in a manner consistent with good taste and in harmony with itself. The magic group of the Duomo, the campanile, and tapistry are united by one sentiment. And if the Florentines be so fortunate as to see this design carried into effect, the Cavalière Matas deserves the credit of having escaped the rock on which many able men have wrecked their reputation, and of having completed a monument which for five centuries remained unfinished, and this with a dignity and originality worthy the best times of Italian mediæval art.* T. L. Donaldson.

* On some future occasion we may give the details of the dome the construction of which is singularly ingenious.

* Some of the details of this cathedral, and illustrations of the campanile of Giotto, are well engraved in some recent numbers of the work now in course of publication, entitled, "Ancient and Modern Architecture."

MONUMENT TO WASHINGTON AT NEW YORK.

On the 19th of last month thirty thousand persons assembled to witness the ceremony of laying the first stone of an enormous monument to Washington, in New York. The members of Congress, ministers of state, foreign ambassadors, and a triumphal car drawn by six white horses, containing a bust of the American hero, surrounded by thirteen young girls in white, to represent the thirteen original states, formed part of an immense procession to the site. The monument is commenced on elevated ground, and being intended to serve as a landmark for ships at sea, is proposed to be of very considerable height. The New York *Weekly Herald* gives a small view of it, showing it to be a tower in six stories, pretending to be Gothic in character, but, so far as we are able to judge, quite contrary to the principles of the style, ill proportioned, and, as might therefore be expected, abominably ugly.

Verticality is the distinguishing characteristic of pointed architecture, as horizontality is of classic architecture, and specially fits it for the production of towers and spires, which are scarcely consistent with the spirit of classic art, and can only be made endurable by the exercise of great skill,—such as was shown by Wren in his London churches. The architect of the Washington monument has entirely sacrificed the principle which so happily adapted the style to his purpose, and has piled story upon story, gradually decreasing in size, and separated by hard horizontal lines, after the fashion of what is believed to have been the arrangement of the Tower of Babel, or a monstrous opera-glass pulled out to its furthest extent. It is much to be regretted that the large sum which this structure will necessarily cost should be thus wasted; and we venture to express a hope that the committee may see this remark in time to obtain a reconsideration of the design before it is carried out.

The "first stone" was a large block of granite, with a cavity formed in the middle of it, in which was placed a leaden coffer containing the current money, the act incorporating the society by whom the monument is to be erected, the journals of the day, &c., and the cavity was covered by an inscribed slab of marble. The inscription sets forth, amongst other things,—that "This section of the foundation was laid by the gratuitous contributions of materials and labour, by the following persons, viz.: the masonry by John T. Allen; the stone by Elisha S. Mott; the corner stone by Beals and Fraser; tablet by Joseph H. Barnes; the cement by J. P. and S. Cummings, Jun.; the lead box by Joseph Aken. The land conveyed to the association by the corporation of the city." Calvin Pollard, architect; Edwin Smith, surveyor.

Our authority says, that when the coffer had been deposited, a shower of money and bouquets rained in from the surrounding spectators, each anxious to make his offering to the memory of Washington. With so strong a temptation to dishonesty, it is to be feared that posterity would have found more had less been given.

In the first volume of The Builder (p. 506), a view and description are given of Mr. Pollard's first design, which was in three stories, surmounted by a metal crocketed spire, the pinnacle of which was 425 feet from the ground. The plan was a pentagon 68 feet in diameter, with a rotunda inside, 40 feet in diameter, for statues of Washington and other great men. There was a projecting buttress at each angle, containing in each a room 22 feet by 19 feet, fitted up as a free library, to contain 400,000 volumes. There were apartments above for the study of the fine arts, and an astronomical observatory, and spaces for large numbers of pictures and statues. How much of the original design, in this respect, has been retained, we are not informed. The estimated cost of the work then, was 400,000 dollars.

SHALL THE INSTITUTE REPORT ON FOREIGN ARCHITECTS' DESIGNS?

Sir,—I must own myself surprised at the opinion you have given respecting the conduct of the Institute of British Architects, in proceeding to take into consideration the merits of the Signor Matas's design for completing the western façade of the cathedral at Florence. In this instance the author has forwarded a view of the project, and solicits the opinion of the members upon his idea. You object that that body should pronounce a judgment on the matter. If it be composed of men learned in the history of their art, versed in the principles of taste, and accustomed themselves to design and execute buildings, surely they are qualified to form a correct opinion; if so, why should they fear to give that opinion, or even to have it published before the world? You object to the precedent—I rejoice at it; for I think it highly honourable to the Institute that a foreign artist should send from the heart of Italy, to ascertain whether his professional brethren in England approve his design. I rejoice in the precedent; and do *not* think it a very dangerous one, for the completion of such an edifice does not occur more than once in a century. If the Institute be alarmed at giving an opinion, under the apprehension of arriving at an erroneous conclusion, or of offending the author, the members are unworthy of the high position they have assumed, as representing the profession in this country. If their opinion be favourable, it surely can be founded upon a matured judgment and justified before Europe. If not, it doubtless can be expressed in terms to carry at once conviction to the mind of the artist, and not unnecessarily wound his feelings.

You have yourself occasionally accused the Institute of not speaking decidedly upon certain mooted questions. The advice you give on this occasion is not likely to promote the

expression of a frank opinion upon subjects submitted to their judgment.

I should observe, that the Cavalière Matas applied to the Royal Institute of France: they referred the matter to a commission, who have given a most judicious and argumentative report, to which are appended the names of Vaudoyer, Le Bas, Le Clerc, and of other distinguished men. May such an example prove infectious, and the Institute not adopt the opinion, that in such a case they best maintain their dignity by a timid reserve!—M. I. B. A.

*** Strong in the correctness of our remarks last week, we willingly give insertion to the above contrary view of the case, to have such weight as it may with the committee who were appointed: at the same time, we repeat the expression of our hope, that they will not be led into needlessly and *uselessly* "flattering the vanity or wounding the feelings" of the author of the design in question. The fact of the French Institute having already done so, would of itself lead us to oppose the course proposed, if there were no other grounds of objection; for we confidently ask, without wishing to underrate the design, whether it is of such a character as should entitle it to the deliberations of England and France, besides those of Italy? It is giving the design an importance beyond its due. There have been several proposals for the completion of this cathedral: there may be, and probably are, more designs for it before the authorities at this moment; and, as we said last week, an opinion given by the Institute might be brought to bear injuriously to superior merit. Let the Institute speak out as loudly as they please, where their speaking will do service, but not in a case like this, where no good *can* be done by it, and harm may.

We have received several letters (four) taking the same view as ourselves—but have room for the following only:—

Sir,—Your account of the proceedings of the Institute of British Architects, at their last meeting, is calculated to inspire considerable misgiving in all men who have attentively watched the tendency of chartered societies to outstep their original purpose, in order to gain a more influential but really less useful position. This observation refers entirely to the appointment of a committee to report on the Cavalière Matas's design for a west front to the Duomo, or rather of the Sta. Maria dei Fiori at Florence, in consequence of a special application to the Institute for its written opinion of that design. The reading of a paper for or against any work of art, provided it be in proper language and fit for a society of men of talent, is a legitimate occupation for the Institute; conferring prizes or premiums on successful competitors for their advertised designs or essays is equally so; but to sit like a grand jury, to decide on *ex-parte* statements on the merits of the whole profession all the world over, and issue certificates of merit, can never have been contemplated by those who granted the charter, nor, at the time, by those who sued for it. Assuredly, if they had put forth such an intention in their application to the Crown, it would have endangered its success, and very properly so; for in an age when the principle of equal rights and fair play is recognised, even grand juries, once the only mitigation of oppressive laws, are become a nuisance from the frequent damage done to the character of persons not in court to rebut imperfect statements. You have very properly remarked, that there may be other designs for the purpose, not before the members of the Institute, by men of talent, who would suffer from a one-sided opinion. It would not be the first competition for this very purpose of a façade to the Florentine cathedral; and if it is to be looked upon as a matter of great importance, so as to allow a dangerous departure from the ordinary mode of proceeding of the Institute, it is to be hoped that the appointed committee will require all the evidence that can be procured, such as the designs that have been on former occasions made for the purpose, and inquire whether any besides that of Cavalière Matas's divide the attention of Italy at this moment. It has been suggested that the designs of Palladio and of Vignola and Peruzzi are well deserving the notice of the architects of this country: let them be sought and compared with each other, and with the worthy knight's performance. Then, and not till then, the committee will be enabled to produce a report worthy of themselves, of the profession, and of our country; then they will be competent to speak of its originality and merit, and do justice to all parties, as it is quite certain they wish to do; for I am fully persuaded that the very eagerness of those gentlemen for the appointment of the committee proceeded from that excellent motive, but prevented them, in the hurry and excitement, from seeing what may be the consequences of a rash enthusiastic proceeding.—I am, Sir, &c. An Amateur.

APPLICATION OF GEOLOGICAL SCIENCE TO THE CHOICE OF BUILDING MATERIALS.

Professor Ansted, in the course of his lectures at King's College, London, has treated largely of building materials, especially of Stone. He said,—The best way to obtain a true knowledge of the nature of the stone, was to look at it in the neighbourhood of the quarry; and, having thus obtained some idea of the action of the weather upon it, one might go into the churchyard, and study the condition of the tombstones, which, being erected in every imaginable direction, were liable to every phase of exposure, and would inevitably show how disintegration was most likely to be produced. A good idea of the value of stone for common use might thus be formed. For stone to be good for ordinary purposes, it must possess several qualifications. It must be of a tolerably even texture, for if it were very uneven it would be acted upon irregularly by the weather. It should possess a moderate degree of hardness, for if it were too hard, it could not be worked, except at great expense; or, if too soft, it would not bear the requisite amount of pressure. If it were very absorbent of water, it would be unfit for external work, as, in that case, the expansive action of frost would be very injurious. Many of the cathedral churches in England showed the results of this particular action of the weather, in cracks and crushes, often in portions of the structures which rendered the condition of the whole very precarious. The professor described, at some length, the various evils resulting from absorption of water by the stone used in building, and concluded his remarks on that point by observing, that great care should be taken to put stones of a laminated or fissile character into the building, in the same way as that in which they existed in the quarry, unless, indeed, they exhibited there a great inclination to the horizon.

The effect of atmospheric action upon stones being a matter of great importance in forming an estimate of their positive and relative value, the possibility of devising some measure of their various qualities, in this respect, was evidently a question of importance. A Frenchman, named Brard, discovered, some time ago, a method which, although not infallible, afforded a pretty accurate indication of the effects of atmospheric action, and which had often been adopted for the trying and describing the qualities of different stones. This method (which the lecturer described at length) consisted of boiling cubes of stone, selected from different parts of the block to be tried, in a saturated solution of Glauber salts, for a certain time. The cubes were then to be suspended by a string, completely isolated from the touch of any thing else, over a vessel full of the solution in which they had been boiled, taking care that no fragments of stone detached in the boiling remained in it. Twenty-four hours afterwards, the cubes would be found covered with small crystals of salt, which were to be got rid of by plunging the cubes into the solution over which they were suspended; this to be done every time crystals of salt were thrown out. The experiment should last four days, and at the end of that time, the amount of disintegration, by the effects of frost and weather, would be indicated by the weight of the particles of stone found in the solution, which had been forced out by the salt.*

Besides the quality of disintegration, there were a number of others necessary to be studied, in order to arrive at a true estimate of the value of stones. The chemical composition of stones, and their power of cohesion, were also of the last importance, and must all be considered carefully.

* The value of this process has been questioned by Mr. C. H. Smith. See "Transactions of Institute of Architects."

Passing over the new red sandstone and lias, he came to the *oolitic rocks*, which were very extensive. They were generally arranged in three groups—the upper, consisting of limestone, with clay below; the middle, of another limestone, with clay below; and the lower, of a variable group, chiefly limestones, containing a few clays and a few sandstones. The most important of these beds were the lower part of the lower division, and the upper part of the upper division. That was the case in England and, to a certain extent, in France,—the *Caen stone* being a continuation of that worked in the west of England, and, probably, of the same age and condition as the Bath stone.

Several useful limestones were obtained from the upper oolites; but, of all these, the *Portland stone* was most extensively known. There were different kinds of Portland stone, varying in value according to the manner in which the different beds were placed, a knowledge of which was very important to the English architect. The most valuable qualities of this stone were its hardness and weight—though both these were qualities which tended to make it expensive both in quarrying, in carriage, and in working. It was a tolerably pure carbonate of lime, of which there was in its composition 95 per cent., with 1 per cent. each of silica and carbonate of magnesia. This was a very good mixture, and the stone possessed an even grain, and was exceedingly durable. Its colour was generally a creamy white, and it was often the whitest of the oolites found in England. It was, therefore, a handsome stone when first worked; but it was liable to blacken very soon when exposed to the action of smoke. All stones, more or less, would blacken in London; but none more so, or sooner, than Portland stone, and it appeared to resist the pyroligneous acid in smoke rather less than others. The west front of St. Paul's Cathedral, which was built entirely of Portland stone, was a remarkable instance of this, being now, though only erected a moderate time, completely covered with soot. The Reform Club, the Goldsmiths' Hall, and many other buildings in London, were, nevertheless, built of this stone. Its cohesive power was not so great as might have been expected from its specific gravity, which was 2·145. It bore heavy weights, however, exceedingly well. In St. Paul's, for instance, though there was a vast accumulation of materials, there was no appearance whatever of the stone being crushed. It was, however, more remarkable for its hardness than for its cohesive power.

The next stone he described was one of a very different quality, and it was that quarried at *Bath*,—a material so soft and so easily worked, that its cost in London was considerably less than that of Portland stone. Bath stone was so soft in the quarry, that it could almost be cut like cheese; but it hardened to some degree afterwards by exposure. It was not so uniform in quality as Portland stone, there being three distinct kinds, which differed in several important points, and in value. The great faults of Bath stone were its softness, which no amount of exposure could overcome; the lowness of its cohesive power, which made it certain to be crushed with only a moderate weight; and its lightness. Its specific gravity differed very greatly indeed from that of Portland stone, being only 1·839. For these reasons it was more adapted for ornamental purposes; though there were some public buildings, and many private houses, built of it, probably on account of its cheapness. It was not at all good for such purposes, however, as might be seen by an inspection of Henry VII.'s Chapel, in Westminster Abbey, where this stone, of which that edifice was built, being exposed under circumstances in no degree unfavourable, was very much decomposed and decayed, and the freshness of its workmanship everywhere lost. Pieces of Portland stone, on the contrary, which were intended for St. Paul's Cathedral, though rejected and probably of inferior quality, bore the marks of the chisel as fresh as possible to this day. Many of the buildings at Oxford were of Bath or Heddington stone, and in that city it had peeled to such a degree as to give the various colleges the appearance of falling to ruin. The carbonate of lime, in its composition, did not differ much in quantity from Portland stone, being 94½ per cent. as compared with 95. It had, however, 2½ per cent.

instead of 1, of carbonate of magnesia, which was an important difference, and there was an entire absence of silica. Its disintegrability was, however, widely different—Portland stone, being exposed by Brard's process to an action supposed to be equivalent to two centuries of exposure to the weather, lost only 2·7 grains; while Bath stone, subjected to the same process, lost 10 grains.

The next stones of this class were those of Rutlandshire and Northamptonshire, of which most of the beautiful churches in the middle of England, remarkable for their good condition, were built. The best of these were the Ketton and Barnack stones. The Ketton was a pure oolite, having a rather coarser grain than the Portland, and not quite so good in appearance. It was, however, better than the Portland, inasmuch as it was worked much easier, and was, therefore, cheaper. It was also not so heavy, and yet quite heavy enough; its cohesive power was greater, and, though at first inferior in colour, it rather improved than otherwise by exposure. The church of St. Dunstan, in Fleet-street, was built of this stone, and, though not very old, had been erected long enough to shew the character of the stone. Its specific gravity was 2·045,—not materially varying from Portland stone, from which it differed in a very marked manner in its composition. It contained 92 per cent. of carbonate of lime, and 4 of carbonate of magnesia, with a little silica. It was much used in Cambridge in the construction of the colleges there, and looked remarkably well; and has been employed in the modern repairs of Ely and Peterborough cathedrals. Its loss by disintegration was 3·3 grains.

The next stone was the Barnack, which was more a shelly rag than a regular oolite: its colour was somewhat inferior, being a white mottled stone, and, therefore, not handsome. It consisted of 93 per cent. of carbonate of lime, and 3·8 of carbonate of magnesia; and its cohesive power was only two-thirds of that of Ketton stone. Its disintegration was very great by Brard's process, being 15 grains; but experience proved that it stood very well, and thus shewed that Brard's method could not always be depended upon.

Besides these, there were limestones which enjoyed a local reputation, such as that of Chilmark, in Wiltshire, which was remarkable for its cohesive power, and that of Ancaster, in Lincolnshire, and others.

The cretaceous beds did not afford building materials, the only chalk used for that purpose being those lower beds, locally called *clunch*, which was a very durable material for ornamental work in situations where it was not either exposed to the weather or to violence. For instance, the small chapels in Ely Cathedral, decorated with carvings of this material, had, after several centuries, preserved the freshness of even the most delicate portions.

The next group was that of the magnesian limestones, which were chiefly quarried in Derbyshire, Nottinghamshire, and Yorkshire. These were exceedingly valuable, as they not only stood exposure well, but were of a beautiful texture. The excellent qualities of the stone quarried at Bolsover were well tested in Southwell Church, Nottinghamshire, in which it had been exposed for many centuries, that edifice being now in better preservation than any other of the same period in England. This stone had become celebrated of late years in consequence of its being selected as the best material that could be obtained in England for the New Houses of Parliament. Though cheaper than Portland stone, it was greatly superior in every quality of importance. Its colour was good, its structure uniform, it could be obtained in blocks of any required magnitude, its specific gravity was greater than that of any other limestone, while its cohesive power was four times that of Portland stone. It was this high cohesive power which made it so decidedly the best stone for the New Houses of Parliament, where the enormous quantity of material to be supported, particularly in the Victoria Tower, rendered this important quality in an unusual degree so indispensable. Added to its other good qualities, on being subjected to Brard's process, any disintegration was scarcely perceptible. It appeared to be, in short, the best building stone produced in England.

Of the sandstones much need not be said. There were a great variety of them, but very few could be called good for building; and those which were good were so hard, that it was unlikely they would ever be used, except locally. They were chiefly the old red sandstone, the millstone grit and the coal grit; but, among these, there were some exceedingly bad, and others could only be used in a rough state, as they would not make ashler.*

* In the *Mining Journal* fuller report of these lectures will be found.

CHURCH BUILDING.

The parish church of Sutton Waldron, near Shaftesbury, having been rebuilt, was consecrated on Tuesday, the 16th instant, by the Bishop of Salisbury. It has been erected at the sole expense of the rector, the Rev. A. Huxtable and his lady, at a cost of about 3,000*l.*, and accommodates from 200 to 250 persons. The style adopted is the decorated. It consists of nave and south aisle, with south porch and chancel, with vestry attached; western tower, with broach spire. The total length inside, 80 feet; width, 30 feet; height of tower and spire, 112 feet. The body of the church is paved with stone, the whole of the seating being uniform and moveable. The chancel floor is inlaid with encaustic tiles by Minton. The windows of the chancel are of painted glass by Hudson and Powell; the ceiling is powdered with gilt stars on an ultramarine ground. The beams of the chancel are illuminated, having scriptural texts, and other inscriptions will be added on the walls as soon as they are sufficiently dry. The communion-table is carved in oak; and a gilt eagle-desk stands at the steps to the chancel. A portion of the west end of the aisle is devoted to the baptistery, the floor and steps to the font being of encaustic tiles, and illuminated inscriptions being written on the walls. The font-cover is carved in oak. The principal windows of the body of the church are of stamped and painted glass, by Powell, and the remainder will be filled with painted glass hereafter. The exterior is faced with flints, and the dressings are of stone from Maperton.

In order to render the whole complete, the rector has furnished the church with new bells and silver communion-service, as well as carpets and velvet furniture to pulpit, desk, &c. The work has been very well executed by Mr. Green, of Pimperne, Dorsetshire, *without* a clerk of works, from the designs of Mr. Alexander.

In the week before last the Bishop of Ripon consecrated the new church at Wyke, near Halifax, built from the designs of Messrs. Mallinson and Healey, of that town. The church, which is called by the name of St. Mary, is in the early English style, and consists inside of a chancel, nave with clerestory, and north and south aisle. There is a sacristy on the north side of the chancel; a tower and spire at the west end of the south aisle; and a porch on the north side of the church. The roofs are open, the timbers being of deal, stained and varnished. The seats will accommodate upwards of 700 worshippers, and are all of deal, stained and varnished, without doors, and *all free*. There is a small gallery at the west end. The pillars and arches, as well as the window mouldings, are all of wrought ashlar; and there is a font opposite the north entrance, the bowl of which is sufficiently large for immersion. The pulpit, reading-desk, altar rails and table, are of oak. The dimensions of the church are as follow:—Chancel, 35½ ft. by 17½ ft.; nave, 68 ft. by 20 ft.; aisles, 54 ft. by 11½ ft.; height from floor to ridge of chancel, 39 ft.; nave, 43 ft.; height of tower and spire, 110 ft. The first stone of the church was laid on Wednesday, February 11th, 1846.

The district church of St. Mark, Staplefield, Cuckfield, the foundation-stone of which was laid on the 19th Nov., 1846, was consecrated on the 18th inst. It is a sandstone building, in the early English style, with double and single lancet windows. The eastern window, of three lights, is to be filled in with painted glass at some future period. The church consists, of nave, 59 ft. by 25 ft.; chancel, 25 ft. by 20 ft.; porch, 11 ft. by 11 ft.; vestry, 10 ft. by 10 ft.; and a projecting bell-turret, with openings for three bells. The nave is the only part appropriated to the use of the congregation, and is fitted up with open benches, containing accommodation for 320 persons, nearly the whole of which are free. The chancel is entirely free of seats. The floor within the altar rails is paved with Minton's tiles. The altar rails are of iron, painted and gilded, and moveable. The porch on the south side, with a deep archway, supported by columns, forms the entrance. The roofs are of deal, stained dark oak, and varnished, and covered with Dampier's patent tiles. The architect was Mr. B. Ferrey, and the total cost about 2,000*l.*

PARKS FOR THE PEOPLE.

Sir,—In consequence of two letters in The Builder, relative to the once intended park at Copenhagen-fields, and the plots of buildings about to cover that interesting spot, I have visited it, and am sorry to find that all hope of saving it from the sulphureous vapours of the brickmaker and the fencing-in of the bricklayer must be given up, and in a short time the whole space between Holloway and Camden Town, to beyond the new road leading to Tottenham, will be covered with houses; several on each side of that road being already covered in, and forming landmarks for various determined lines of streets, &c. To one who, like myself, first courted the beauties of Nature in those very fields, when, in pursuit of a splendid butterfly, or gathering daisies, buttercups, or wild hyacinths, the view between the White Conduit and Highgate was uninterrupted by any building save the one isolated, countryfied Copenhagen House, beyond the little wood that bore the same name,—the change is conducive to serious reflections, like the fond illusive visions of early youth. To think that the expenditure of a few thousands might have saved those green fields and hedgerows from the encroachment, seems to throw some doubt on the consistency of those who talk much of Schools of Design and a Health of Towns' Bill, whilst they neglect obvious opportunities of securing healthy recreation and the sight of beautiful Nature to our working classes, who can ill afford the expense of railway excursions. I have also visited the Victoria-park, near Homerton, a space of, I believe, 157 acres of ground, purchased several years ago. If the management of that concern is a sample of what may be expected if government carried out the public park system, there is some consolation for their negligence in purchasing a belt of public ground round the metropolis, for nothing can be more unsatisfactory than the way that the ground has been smoothed, cleared of hedges and trees, planted in tasteless squares of small dimensions, &c. None of the advantages of the locality have been understood or turned to account. First, a field or two towards the Lea river ought to have been added, to prevent buildings from shutting in one of its finest prospects: the undulations of nature might have been assisted so as, by raising a considerable mound on the elevated centre, to command distant prospects, which will soon be built out. It used to be a favourite, a beautiful spot, rather wild, varied, and luxuriant; it is now comparatively dreary, tame, and of course insipid. It is evident that in annihilating the charms of nature, no principles of art have been resorted to, to compensate for the injury of the sad system of stopping up pathways alluded to by your correspondents. I may, with your permission, on a future occasion, mention a few interesting instances indicative of the unprotected rights of the people.

I am, Sir, &c., A Faithful Observer.

Machine for Raising Heavy Bodies in Deep Water.—A new machine, of which a gentleman of Worcester, Massachussetts, is the inventor, designed for lifting heavy articles from the bottom of deep water, is thus described:—A large vessel, containing materials for generating gas, is let down to the bottom, filled with water. The weight is attached, and the combustibles are ignited for the creation of the gas, which expels the water, and raises the vessel to the surface with a force of over 60 lbs. to the cubic foot. The machine is said to be simple, cheap, and likely to be very useful.

NEW LONDON COAL EXCHANGE, LOWER THAMES STREET.

MR. J. BUNNING, ARCHITECT.

NEW COAL EXCHANGE, THAMES STREET.

THE former Coal Exchange being inadequate and inconvenient for the purposes required, an enlarged site was purchased by the corporation of London for the erection of a new Exchange, having a frontage next Lower Thames-street of 113 feet, and a similar frontage next St. Mary-at-Hill; and on this the building represented by the annexed engraving is now being erected from the designs of Mr. Bunning, the architect to the corporation. It is arranged so as to give an increased width to these thoroughfares, and presents two distinct elevations, connected by a circular tower, 100 feet high, within the re-entering angle formed by the two fronts. The front of the whole is to be faced with Portland stone.

The building will contain on the ground-floor, in addition to suites of offices, an area of upwards of 4,000 superficial feet for the meeting of the merchants, including a circle 60 feet in diameter, the whole height of the building, covered with a glazed dome of cast-iron ribs, supported on each story by ornamental cast-iron stauncheons. This, from its magnitude and novelty of design, will form a prominent feature of the building. The height from the floor to the top of the dome will be about 70 feet.

There are likewise provided suites of spacious well-lighted offices and committee-rooms, occupying four stories of the building, for the accommodation of the merchants, factors, and meters; the accesses to them being by projecting galleries of fire-proof construction, within the circle under the dome.

The cost of the building will be about 36,000*l*. Mr. William Trego is the contractor for the erection of the building, excepting for the founders' work, which is to be executed by Messrs. Dewer, of Old-street.

TRANSFERENCE OF PAINTINGS ON WALLS TO CANVAS.

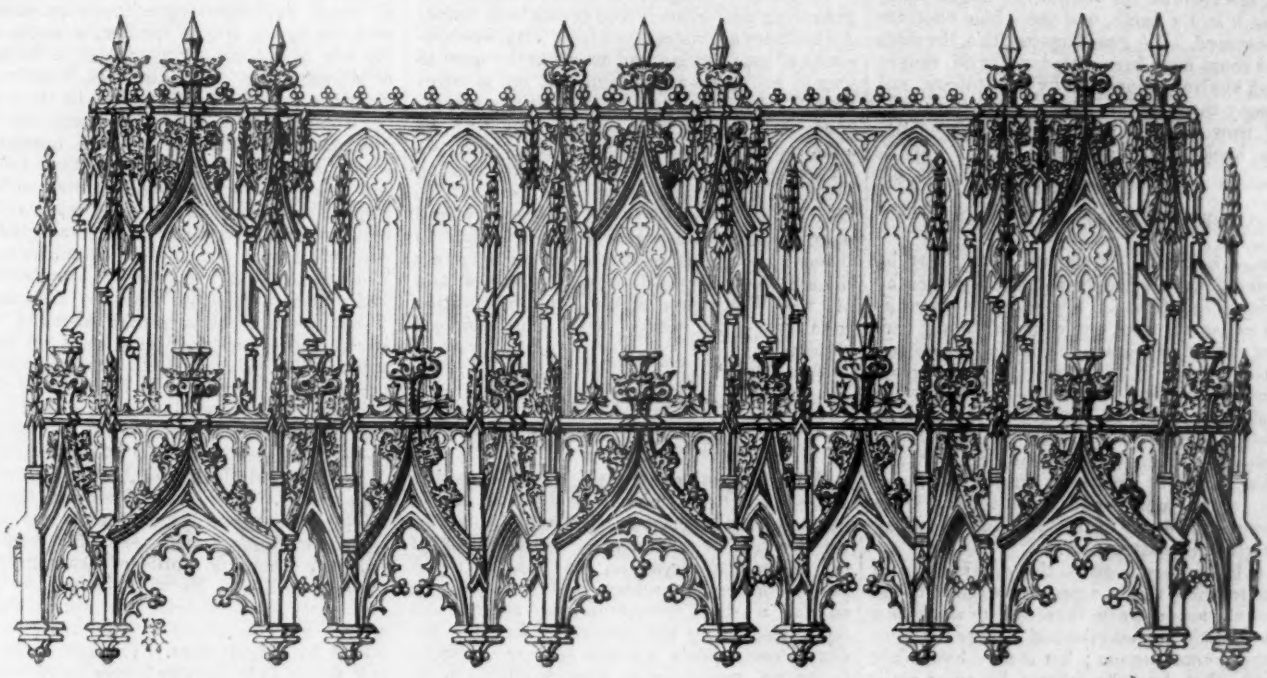
THE preservation of the paintings on plaster, with which certain of the ceilings in the old rooms of the British Museum were decorated, being deemed impracticable or not desirable, they were given up to destruction, and were for the most part knocked to pieces. Dowling, a modeller, being anxious to save some of them, applied himself to transfer some of the groups to canvas, chiefly from the library, and has succeeded admirably. The following was the course he pursued. With a paste composed of equal quantities of boiled oil, flour paste, and glue, he fastened a cloth to the whole surface of the painting proposed to be removed, and formed a frame-work in front, to support the painted plaster when loosened from the wall behind. He then cut away the timberwork (in some cases brickwork) to which the plaster was attached, and, with scrapers, gradually removed the plaster from the back of the picture till the colour began to show, leaving a surface of about the thickness of a penny piece. With a similar paste to that first mentioned, the painting was fastened to canvas strained on a frame, and the picture being freed from the cloth on the face of it by the application of warm water, and afterwards cleaned with soap and water, the operation was complete.

The patience and ingenuity of Dowling are so praiseworthy, that we consider it but an act of justice to mention the circumstance, and to say that the various portions he has thus preserved, some of them large groups, are at his lodgings, No. 12, Drury-lane.

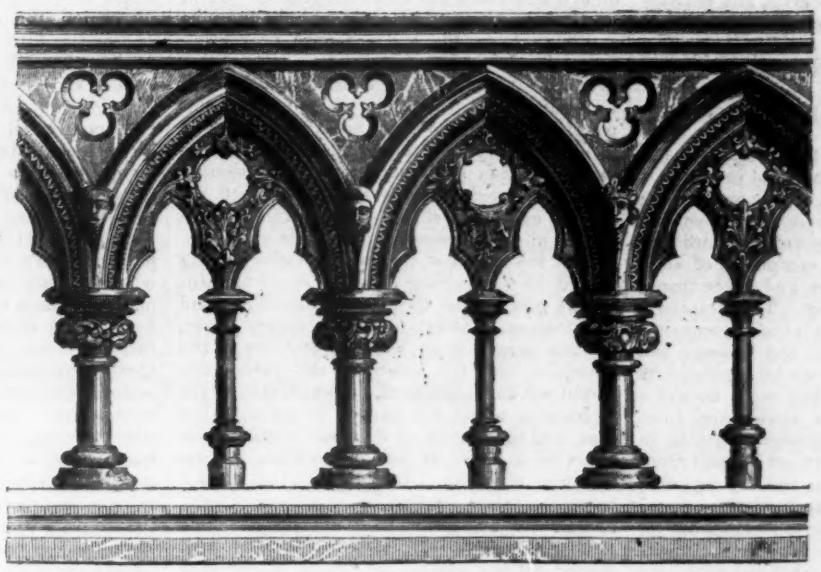
RESTORATION OF THE "THEATRE-FRANCAIS," PARIS.

THE decoration of the Théâtre-Français, which has been going on for some time past under the direction of M. Fontaine, the architect, is now finished, and is highly praised by our Paris contemporary, the *Moniteur des Architectes*. It includes some structural alterations and arrangements to improve the house for hearing. The front of the boxes has been brought forward considerably; the royal box removed from the centre, where it was greatly in the way, to the left side of the proscenium; and the domical ceiling has been lowered. The general decoration is white and gold, and the hangings of the boxes cherry colour. Open partitions separate the boxes in lieu of the former close divisions, which had a bad effect on the sound. Simplicity with great dignity is said to characterise the whole.

MODERN CARVINGS.



CANOPY AT ELVASTON CASTLE.



ALTAR RAIL, CHRIST CHURCH, ENDELL-STREET.

MODERN CARVINGS.

The accompanying illustrations of wood-carving recently executed in England, will be interesting to those of our readers who are watching the progress of taste and consistency in ecclesiastical decorations. One specimen represents the altar-rail, 2 feet 3 inches high, and 20 feet long, recently executed in oak by Mr. W. G. Rogers, from the design of his son, for Christ Church, Endell-street. The style which has been adopted for its fabrication, viz., the early English—a style in which modern works of a similar nature are rarely found to be successful—makes it form part of the edifice which its introduction adorns.

The other example is a repetition of an elaborate Gothic canopy, brought from Nuremburg some years back, and now in the possession of the Earl of Harrington, for whose magnificent castle at Elvaston the accompanying work was required. It is about 5 feet 6 inches wide, and divided into three principal compartments, which are intended to surmount figures of mediæval character, while its minute parts are crowded with a profusion of crockets and pinnacles. Among the chief merits of the design, however, may be mentioned the harmony which exists between the boldness of the more prominent details and the faint character of the enriched background. We are indebted to our excellent contemporary, the *Art-Union Journal*, for these illustrations.

CONSTRUCTION OF FIRE-PROOF STRONG-ROOMS.

The difficulty of constructing an efficient fire-proof room for the preservation of papers is considerable, the need for ventilation warring with the necessity of being inaccessible to fire. The trustees of the Bridgewater Estate have recently constructed at Hulme, Manchester, a room of this sort, at a cost of about 400*l.*, concerning which a correspondent has sent us some particulars.—A back parlour has been gutted for the purpose, and a safe of the dimensions of five yards square has been built, from the ground, of fire-proof bricks and cement, the roof being composed of the same materials and supported by three arches of iron. The wall is formed of two very strong fire-proof shells, the space between them all round being filled with a non-conducting substance. The entrance is down a flight of several steps. The door-jambs, lintel, and threshold, are of solid iron, clamped, or built in by long flange-like projections, at three points on each side, to the main wall of the building, so as to be immovable. The door consists of three parts—the fraud-proof plate, the lock-case, and the fire-proof chest, which is filled with a patent composition which at a certain temperature becomes steam, finds entrance to the safe, and, saturating the papers, prevents them from firing. The bolts are fourteen in number, five on each side, two at the top and two at the bottom. The whole door turns upon thick iron pivots springing from the top and bottom, and working in sockets, cavities in the lintel, and threshold of the door. As thorough ventilation is necessary for the preservation of deeds, papers, &c., channels for the passage of air are prepared in the room, and a ventilator provided at the top; but this very necessary arrangement to some extent defeats, as we have said, the purpose of the trus-

tees, by rendering the room liable to fire within. A party going into the place with a candle or lamp, as must always be the case, on account of the total exclusion of light, might drop a spark among any loose papers, and, the door being shut, the current for ventilation might possibly fan it into a flame, and the whole contents be consumed. To guard against this, the sides of the room have been fitted up with ranges of iron shelves, supported by iron pillars, and to occupy these shelves the trustees have fireproof iron safes, in which to deposit the title-deeds, books, and vouchers.

OBSERVATIONS ON DESIGN.

Sir,—Design, in its plainest sense, may be considered as a creative faculty, acquired by copying simple forms. The study is as unlimited as nature, and not confined to any particular sphere or region. Want of means and opportunity may check the student's progress towards perfection; but whatever may be the prejudiced opinion of the world, there is no partiality in the bestowal of the endowment requisite for becoming eminent; whilst talent in the humblest grade is sometimes found equal to the most studied and refined, when combining members for the purpose of forming some great superstructure.

It is but falling back on the observations of others to state, that the greatest masters in the school of design were those whose works are marked with an astonishing degree of simplicity in construction; but it may be further noticed, that he who effects by some plain principle of science what takes in others a combination of complex forces, has made the greatest progress towards perfection. This simplicity can only be retained by keeping in view the unalterable laws of material, and making them subservient to the purpose. And in all instances where labour or solidity is wanting or thrown away, it must arise from aiming at unnecessary durability, or from ignorance of the detailed members into which every design must be subdivided.

As an example, man is the masterpiece of design in the world. The original intention is fully carried out, both as a whole and in the minutest section. It is impossible, according to our ideas of creative power, to introduce into so small a compass, composed of such fragile material, more action and force than a man is capable of exerting. The simplicity apparent in every movement is the consequence of perfect articulation; and the leverage and deflection of the members are all regulated by a general law. From the beginning he was a labourer, and toiled for his sustenance, combining within him all the strength suitable to his calling. By degrees he raised himself from the earth as a mere drudge, and, by transferring a portion of his own mechanism to metal and wood, learned to mentally direct what he before physically executed.

Our improvements in mechanical arts, our inventions, and our wonderful discoveries, are nothing more than segmental copies from ourselves, excepting that the motive power requires a complex arrangement, in consequence of the system being fragmentary; and it is very possible, since we have so far progressed in the knowledge and application of those forces, that we may still approximate to perfection, and ultimately bring the manual labour of the civilized world altogether within the range of machinery. Still, let the degree of perfection be what it may, it is nothing more than a copy forced on man by necessity, and therefore cannot take an exalted range as a section in the School of Design, notwithstanding which, we learn from our knowledge of the subject, that in order to progress with confidence, where the imagination may have its greatest license, we must not lose sight of first principles for an instant.

These fundamental axioms are learned by every person when first about to enter the field of construction; but they are not followed out subsequently. Can it be that our knowledge is so ample, that we may substitute ideas which shall safely supersede those pointed out by scholastic laws? We require ornament and convenience, which cannot always be reconciled with purity of construction; and though we quit for a moment what was established centuries ago, and confirmed in accuracy by the lapse of ages, we fancy we never wander so far as to render our designs inharmonious. Limited means suggest alterations, and it is prudent that economy should be practised either in a private or a national undertaking.

In this does the proof of ability consist. In producing perfection is true genius to be found. An ordinary architect may design a faultless specimen of construction, and carry out the same, as long as his means are not limited; but to introduce this purity of style and requisite convenience with niggardly economy, can only be achieved by the man of intrinsic judgment. As long as prejudice and chimera are the leading ideas in formations arising from the mind, we must not be surprised at any innovation forced upon us, however disproportioned or monstrous it may appear; yet must the world grieve that the architects of the Choragic monument and of the Wellington statue drew inspiration from the same source with such different results.

Francis Sullivan.

Manchester.

RAILWAY JOTTINGS.

The suggestion of a safe mode of raising and working such tubular bridges as are in course of construction at the Menai Straits and the Conway, is one, says a correspondent of the *Mechanics' Magazine*, that may save the pockets of the shareholders in the first instance, and the necks of enterprizing travellers in the last. Regarding the results of formulæ deduced from models in a case such as this to be fallacious, especially as regards vibration, as the most destructive element in all such railway works as bridges, viaducts, and even slopes and tunnels, he proposes, in an unprecedented experiment such as this, to keep on the safer, though less venturous and enterprising side of so untried a novelty, by erecting only one tube and one set of rails, and not only preventing two trains from ever meeting on such ticklish ground, but the locomotive head and front of all possible vibratory offence from ever accompanying a train on such an expedition. "I would suggest," he says "that the trains in each direction shall be drawn by stationary power, or even by rope machinery with revolving cylinders, so as to bring the driving-wheels of the locomotive over these cylinders and by the action of the engine (which being placed on a revolving cylinder could not progress), give motion to the rope machinery, and thus even save the expense of stationary power. By this arrangement, also, the stability of the structure, and the safety of the passengers, would not be endangered. The weight of the locomotive would not have to be borne by the tube, and the motion of the train would necessarily be so slow, as not to generate any destructive vibration. In adopting two tubes," he adds, "they cannot be any mutual help, unless they are attached to each other: if so attached, the combined effect of the vibration caused by the passing of trains in opposite directions may prove much more destructive than can be anticipated; and should it be said that it is not intended to allow two trains to pass each other on the bridge, it will then follow, as a matter of course, that one tube is as good as two for all useful purposes."——The amount of traffic for last week, on upwards of 3,227 miles of railway, says the *Railway Chronicle*, was 178,975*l.*, thus accounted for:—82,091*l.* for passengers, 47,998*l.* for goods, and 48,886*l.* for passengers and goods together; being an increase of 25,091*l.* over the corresponding week of last year, when the mileage was about 2,525.——Enormous quantities of fish are daily arriving in London from Ramsgate. Heavy fish trains reach the Bricklayers' Arms station of the South-Eastern Railway almost every morning, at an hour suited for delivery in Billingsgate market. During the last week, trains of nearly 30 trucks of fish have been thus received. "We believe," says the *Times*, "that this great increase is partly to be attributed to the increased energy of the fishermen, consequent on the facilities and advantages they derive from railway communication. The South-Eastern Railway are doing their best to encourage the trade. Let us hope that Ireland may take a lesson from the fishermen of Ramsgate, Broadstairs, Deal, and Dover." Ireland, however, has peculiar views of her own on this particular subject, as the ready reply of a native to the like recommendation,—"Sure you would not take all the fish out of the sae?"—sufficiently attests. ——The other morning, says a contemporary, a novel scene took place at the Chelmsford Railway station—nothing less than the officers of justice marching on the line, with warrant in hand, and clutching a first class carriage, with the strong arm of the law, in payment of the sum of 31*l.* due for poor-rates to the parish of Margaretting. The directors, it seems, had imagined themselves aggrieved by the weight the overseers had laid upon them, and commenced an appeal at the last quarter-sessions, when it was thought the question was in a train for decision, but they suddenly stopped short and abandoned it, while still the cash was not forthcoming; so that nothing was left for it but a little compulsion. —— The efforts of the Trent bridge contractors to find a firm foundation, says the *Lincolnshire Times*, have hitherto proved abortive. The works, we understand, have been let for the sum of 30,000*l.*, but from the enormous expense incurred already, and the great outlay yet required, there is every prospect of its costing considerably more than the estimate. ——The High Tor tunnels at Matlock, on the Manchester, Matlock, and Ambergate line, are progressing. The tunnel nearest Matlock-bridge is completed for 80 yards; and at the south, or Matlock-bath end, 50 yards are finished, besides 28 yards of heading in the middle cutting. Between 30 and 40 yards of tunnelling have been cut during the last month, and the whole will probably be completed by August next. The still more difficult tunnel at Willersley is now being wrought at eight points at once, by the contractor, Mr. Harding.——The great tunnel under Liverpool is about the only one in connection with the London and North-Western system on which there are no particular appearances of suspension, the object being to connect as soon as possible, by a tunnel of 2¼ miles, the goods depôt at Edghill with the North Docks at the water's edge, where the bulk of all the foreign shipping centres. This is the 'Victoria Tunnel,' contracted for by Messrs. Holmes and M'Cormack, who have between 1,000 and 2,000 men at work on it, and have already carried the driftway half through. The operations are very dangerous, and in some places shake the foundations of the houses, which at many points are only at 50 to 80 feet above the level where the rails are to be laid, while, in other places, there is a variation of from 90 to 100 feet. This tunnel undermines in its course three or four places of worship, churches, Quakers' meeting-houses, and Baptist chapels, which will be only 66 feet above the run of the locomotive. One-half the tunnel is good to work through, consisting of rock and sandstone; but as it approaches the locks, the soil is of a treacherous kind and rubbish. The railway company have to pay compensation to the owners of every house and building the tunnel passes under.——The operations at the Tweed viaduct and bridge, where the masons lately struck work, have hitherto been making rapid progress. Pile-driving has been going on for several months; a wooden communication has been established between the two sides of the river, and at each side large portions of the temporary wooden bridge have been erected, which, from their height and intricate construction, are said to have an imposing effect.——The contractors for the Beattock contract of the Caledonian line have eight of the drilling machines already noticed in The Builder, at work on the lower part of their laborious summit cuttings. This machine consists of a ponderous rod sharpened at the lower end so as to form a round hole in the rock, and is alternately raised and depressed with great force by means of a driving-wheel, worked by eight men, a ninth attending generally to the machine, and keeping the drilling rod at a low temperature by a plentiful supply of water. In the evening, when the holes have been finished, they are charged with gunpowder, the machines removed, and a general blasting effected. The introduction of these machines, it is said, has facilitated operations very much. Though invented in America, the inventor, it seems, is an Englishman. For about a mile in length to which it extends, by about 50 feet less or more in depth, this summit-cutting still employs 700 men, although several hundreds have been paid off; and the blasting process has consumed no less

than three tons of gunpowder and 30*l.* worth of beer per week for many months past. The Evan, a stream which has cut its way through a goodly portion of the same work without the aid of either blasting, beer, or any thing stronger than water, is to be remunerated by the accommodation of 'a huge iron tank,' open, of course, at each end, and laid along the route which this useful stream had cut out for itself, but at a higher level than that of the railway line. The Evan, however, appears to be any thing but satisfied with this arrangement, for it has swelled up and 'given a good deal of trouble during recent floods, by filling up with gravel the culvert or bridge built for the control of its waters.' Rows on rows of huts, says our informant, here form a temporary town in the wilderness, "with shops, stalls, stables, storehouses, even a post-office, all on the bleak moor, whence in turn they must again disappear, and allow the wilderness to resume its wonted quietude, undisturbed save by the occasional whistle of the engine as it whizzes past." We well remember the impression of human power and progress which the striking contrast of a good old mail-road winding its way through this dreary district, years since produced on our mind; but little did even the most extravagant visionary then anticipate the advent of a time, so speedily too, when such an impression would be remodelled and recast, as it were, into a fresh and matter-of-fact, utilitarian, and unexaggerated mould, like that which follows:—"The mail road which winds along the same valley was an able and great work in its day; but, contrasted with what has now been accomplished, the one may be likened to the cart which creeps along it at three miles an hour, and the other to the locomotive whirling away on it with a train of ponderous carriages at ten times the speed!" Arrangements, we understand, are in progress for the opening of this line from Beattock to Edinburgh on the 20th of December, so that then the route from London to Edinburgh (and indeed by branch to Glasgow) *viâ* Carlisle, will be complete.

SUSPENSION OF WORKS.

On the various lines of railway in course of formation in the Birmingham district, a further discharge of several hundred labourers has been ordered, and, amongst the disastrous consequences on a small scale of suspending the railway works, may be noted the effect of the panic on the brickmakers. "Acting upon the great and continued demand," says the Birmingham correspondent of the *Daily News*, "and presuming upon its continuance, many persons embarked in this trade have, from the causes referred to, been involved in ruin. A failure is spoken of to the extent of some seven or eight thousand pounds, and others to a smaller amount, but the injury is not the less deeply felt." The works in this district, especially the Birmingham and Oxford Junction, have for some time proceeded very slowly. The London and North Western Company, who, about a month or six weeks since, had nearly 50,000 labourers employed in new works, have now discharged more than 25,000 of them, reserving the remainder for indispensable works. Many more have been discharged from the Chester and Holyhead, now that the works to the Conway are completed. About 400 were discharged last week from the Stamford and Rugby works, near Morcott, Rutland; and Mr. Pickering, the contractor, states that 1,200 others will be discharged from works in which he is concerned in other parts of the country. With those works, besides, which are still in progress on the same line, orders have been given to proceed slowly, the contracts being extended over double the original time. This is also the case on the Rugby and Leamington. The Stour Valley works are partially suspended. Those on the Buckinghamshire lines are to go slowly, and some of the branches, for which Acts have been obtained, are, it is understood, to be abandoned altogether. The greater part of the works upon the Edinburgh and Hawick line have been stopped, and the labourers employed upon it paid off to the number of about 5,000. On Friday and Saturday week nearly 1,400 labourers were discharged. "We are sorry to learn," says the *Montrose Review*, "that the various contractors on the line of the Aberdeen Railway, north of Dubton (Montrose), have received notice from the directors that it is their wish to suspend operations for the present. In consequence, numbers of navvies who have been discharged have gone southwards in quest of employment; but not a few are lounging about our streets." In short, the only works on which any degree of activity is continued, are those of the Caledonian, the Leeds and Dewsbury, the Great Northern, the Sheffield and Grimsby, and the Chester and Holyhead. The expenditure on even these works, however, or the most of them, has been reduced one-third. Besides the works in actual progress, many of those about to be commenced have of course been also hung up, for the present at least. This is the case with the Shropshire Union, the Northampton and Banbury, the South Staffordshire, the Birmingham and Lichfield, Coventry, and Nuneaton, the East and West India Dock Extension, the Bristol and South Wales, *et multis aliis*. The general suspension of works has already begun to react injuriously upon the iron works, it is rumoured, and much and wide-spread future distress is dreaded in various quarters.

ELECTRO-TELEGRAPHIC PROGRESS.

There are at present 1,050 miles of telegraph in daily operation, 262 miles in progress, and 928 miles about to be commenced, making a total of 2,240 miles, the whole of which, it is expected, will be completed early next year. Interesting as this considerable progress towards the nerve-like organization of the surface of our own country is, however, there is something even still more interesting in the fact, that our American brethren have completed, by one continuous line of telegraph, the instantaneous communication between two places,—Montreal and New York,—distant, literally, in space, or by telegraphic route at least, no less than ten hundred miles and upwards,—an odd twenty miles, indeed, which of course, in such a case, are not worth mentioning. In consequence, by the way, of what is regarded on the other side the Atlantic as extravagant charges, — probably moderate, however, even as they are, by contrast with our own,—the editors of newspapers in Quebec have determined not yet to avail themselves of the telegraph from Montreal.——The telegraphic newspaper lately announced in The Builder, has been advertised. It is to be called the *London Telegraph*, and will be a threepenny paper, published daily at noon, with electric expresses, through the Telegraphic Company's establishment, from Birmingham, Bristol, Barnsley, Bradford, Berwick, Bridlington, Canterbury, Coventry, Chester, Cheltenham, Chesterfield, Cambridge, Chelmsford, Colchester, Deal, Dover, Dorchester, Derby, Darlington, Edinburgh, Folkestone, Glasgow, Gloucester, Gosport, Halifax, Hull, Huntingdon, Hertford, Ipswich, London, Liverpool, Leeds, Leicester, Lincoln, Lowestoffe, Margate, Maidstone, Manchester, Northampton, Nottingham, Newcastle, Norwich, Peterborough, Ramsgate, Rotherham, Rochdale, Southampton, Sheffield, Stafford, Scarborough, Stamford, St. Ives, Tunbridge, Wolverhampton, Wakefield, Winchester, Wisbeach, Ware, Yarmouth, York.——The electric communication has been completed by the Telegraphic Company between Manchester and London, and closing prices in money and share markets are now transmitted by telegraph.——The arrangements have been decided upon for opening a direct line of telegraph between London and Vienna.

NOTES IN THE PROVINCES.

The improvements and additions to Ipswich have become so extensive of late years, that not only is the appearance of many of its localities entirely changed, but what a few years since was termed its vicinity, is now studded with dwelling-houses. "During the past week," says the *Cambridge Chronicle*, "very extensive plots of building ground have been opened up to the public in an entirely new direction—Mr. Fonnereau having had an opening cut through Tower Ditches in a direct line with Tower-lane, removed old houses that had stood for centuries, and made a complete opening into that portion of his estate which lies to the west of Dairy-lane." Two roadways, 40 feet in width, are being formed, on each side of which are to be erected villa residences, in view of the Orwell, Stoke Hills, and Christ's Church Park. It is also proposed to establish a public park near Ipswich.——The Board of Ordnance are now looking to the more complete fortification of Gosport. They have ordered the purchase of about 600 acres of land, for circumvallating the north side of the present fortifications either by a continued line of rampart, or by detached forts or Martello towers.——The building committee of St. Thomas's Church, Winchester, still require 600*l.* besides the 7,000*l.* already expended on the new church, which, besides, has not yet been provided with either belfry, tower, or spire. The outlay, however, seems to have already exceeded the original estimate for building a new church, capable of accommodating the population of the parish, which is said to have been 4,000*l.*; and the old church, which was pulled down, might have been made as large, it it said, for an outlay of 1,000*l.*——The plan and estimate of Mr. Davis, of Frome, for the erection of the new Town Hall and Market House at Yeovil, have been adopted. The cost, exclusive of the site, will be about 3,500*l.*, and the work, we understand, will be forthwith commenced.——The second list of subscriptions towards the restoration of Hereford Cathedral, now amounts to upwards of 8,000*l.*——The Coventry Cemetery, commenced in 1845, has been consecrated. It comprises an area of rather more than 18 acres, of which about one half has been set apart for dissenters. There is a church in the Norman style, and a dissenters' chapel in a sort of Italian style. The walks are about two miles and three quarters in extent, adorned with numerous evergreens, flowers, &c.——The walls of Cranoe Church are nearly ready for the roof. It is regretted that the tower could not have been also rebuilt, but the funds are deficient even as it is.——The 21,000*l.* expended in the erection of the sea-wall north of the entrance to the great float, at Birkenhead, is to be refunded by Government, on condition that it be applied at once towards the furtherance of the other unfinished works. An early resumption of the works, therefore, is now anticipated.——At the instance of the Leeds Council, the Bishop of Ripon has closed the burial-grounds in that town.——In accordance with a resolution already recorded in The Builder, the directors and subscribers to the National Monument, Calton Hill, Edinburgh, have issued parliamentary notices of an intended application to the Legislature for power to alter and enlarge their act of incorporation. The capital stock is to be increased by new shares, a church and place of sepulture dispensed with, and the building decorated with sculpture: maintenance and repair to be upheld by charges for admission.

Syro-Egyptian Society, Nov. 9. — Dr. John Lee in the chair.—Mr. W. F. Ainsworth, the honorary secretary, announced the presentation to the society of rubbings made by Dr. Holt Yates, the Syrian secretary of the Ameatic inscriptions contained on the sculptured monument lately discovered at Larnaka, in the island of Cyprus. Also, of rubbings of an inscription to the Emperor Vespasian, found near Beyrout, in Syria, made by Capt. Newbold. Also, a number of books presented by Dr. Schwartz, of Vienna; and an engraving of the new Protestant church at Alexandria, by the architect, through M. Bonomi. Dr. Peate read his first part of a memoir "On Frankincense," being such portion as referred to the frankincense of India, the origin of which he referred to various species of Boswellia. Mr. Samuel Sharpe read a paper on the "Determination of the Alphabetic Sound which should be given to a Hieroglyphic." It was the well-known character for "good," to which he gave the force of B, and supported his opinion by nine words and names, in which it is found. On the determination of this letter depends the reading of the names *Chebra* and *Scemiophra*; and Mr. Sharpe thence brought forward what he considered proof that Manatho's XIIth dynasty immediately preceded his XVIIIth, thereby annihilating the larger number of centuries that Chevalier Bunsen and others place between these two dynasties. Mr. John Landseer exhibited and made some remarks upon a cast of a Gnostic emblem of Homo and Typhon, that was nearly covered with hieroglyphics.

GIRDERS WITH TENSION RODS.

Fig. 1

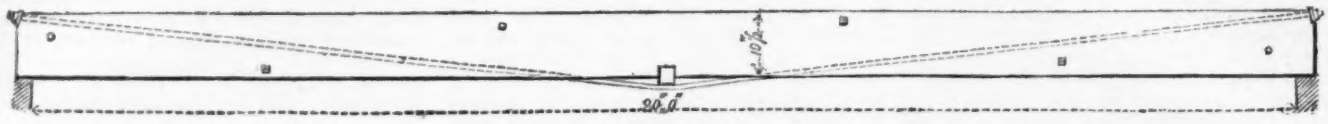
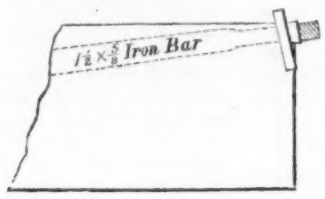
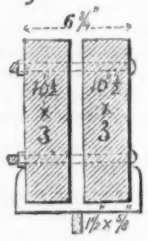


Fig. 2



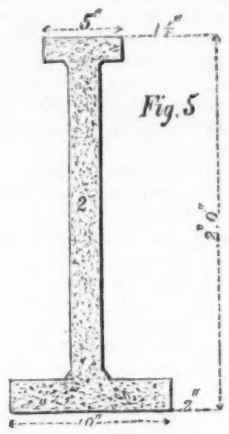
End Enlarged.

Fig. 3



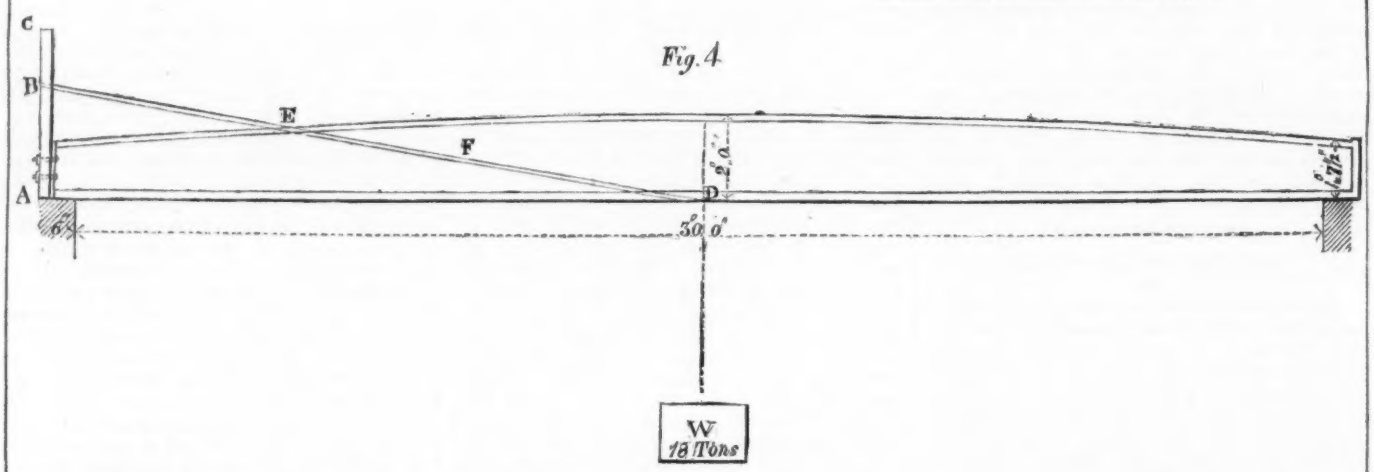
Section through Centre of Fig. 1.

Fig. 5



Section through Centre of Girder, Fig. 4.

Fig. 4



EXPERIMENTS ON THE UTILITY OF TENSION RODS,

AS SOMETIMES APPLIED TO GIRDERS.

THE following is a record of the experiments conducted at Mr. Cubitt's, Thames Bank, to which we referred in a recent number.

Fig. 1 is an elevation and fig. 3 a section of a wood beam, trussed with an iron rod. The two pieces of timber forming the beam were bolted together, and the tension-rod introduced between them. The beam was at first tried with the nuts at end of rod loose; they were afterwards tightened up, and the beam loaded precisely as before.

Only 52 cwt. were applied to the beam before the tension-rod was tightened up; had more been added, it was considered the beam would have been strained, and the tension-rod would not have had a fair trial. The results are given in the following table:—

Weight applied to middle of Beam.	Deflection with Nuts of Tension-rod loose.	Deflection with Nuts of Tension-rod tightened up.
Cwt.	Inches.	Inches.
12	·35	·325
20	·71	·637
32	1·105	1·01
40	1·375	1·29
52	1·75 set 1-16th *	1·7
60		2·05
72		2·35
80	* This set ought to be added to the deflections in the adjoining column.	2·75
92		3·75
100		5·875

Fig. 4 is an elevation of a large cast-iron girder or beam, at the end of which is shewn a piece of wood AC securely fixed. EF is a stout rod (representing the position of a tension bar), one end turning on a centre B, and the other end resting on a block D fastened to the bottom flange of the girder, at equal distances from the bearings.

The object of this experiment was to shew, on applying the weight W, how much the distance BD increased; or, in other words, to what extent a tension bar fixed at the points BD would be stretched.

The variation in the distance BD was taken by a vernier, one scale of which was affixed to the block D, the other to the rod EF. The height of the point B, above A (or the bottom of the beam), was varied in the experiment.

The weight or load was applied by means of hydraulic pressure, and the deflection with 18 tons was 6-10ths of an inch.

When the height of the point B above A was 1 ft. 5½ in. the distance BD increased ·038 inch.

When the height of the point B above A was 2 ft. the distance BD increased ·0217 inch.

When the height of the point B above A was 3 ft. the distance BD increased ·0064 inch.

A similar experiment was made with a cast-iron beam of different dimensions; the particulars and details are as follow:—

Length of bearings .... 24 ft. 10 in.
Depth of beam in middle 1 ft. 4½ ,,
Do. at ends..... 7½ ,,

The weight applied to the middle was 12 tons, the deflection 7-10ths of an inch.

When the height of the point B above A was ½ in. the distance BD increased ·0382 inch.

When the height of the point B above A was 10 in. the distance BD increased ·013 inch.

When the height of the point B above A was 1 ft. 8 in. the distance BD *decreased* ·0145 inch.

When the height of the point B above A was 2 ft. 6 in. the distance BD *decreased* ·034 inch.

We leave our readers, for the present, to make their own deductions.

We have before us a long and valuable series of experiments on girders, made for Mr. C. Parker, architect, by Mr. G. B. Cooper, of Drury-lane, to which we shall give early attention.

MEMS. ABOUT GAS.

OUR further remarks on the returns made by the gas companies to the House of Commons must give place, in the meantime, to an accumulation of miscellaneous notes on points, for the most part, of a more temporary and fleeting interest in the progress of the general movement towards cheap gas and an abundant diffusion of its benefits.——The Gas Movement is gradually but steadily worming itself into the most vital interests, and anxieties, and resolutions, of the people, far and wide.——At Abergavenny, an improvement of the 'farthing rushlights' at present dispensed to the public, is said to be much wanted, and a new gas company, therefore, is about to be formed. ——Under the now well-recognised head of 'The Gas Movement,' the *Bedford Times* intimates that the price of gas at Bedford has been reduced from 10s. to 7s. 6d., and that the inhabitants are much in want of an extension

of the street lights—and no wonder—as well, no doubt, as of the house lights likewise, although the darkness that there prevails—in gas light, at least,—is not yet so visible as it will be when another half-crown or two is deducted from the prohibitive price.——A correspondent, "X. Y. Z.," informs us that The Movement is at work in Slough, where Mr. J. C. Buckmaster has been endeavouring to enlighten the inhabitants, both mentally and ocularly, by lecturing on the subject, and advising the Sloughites to take so safe an investment into their own hands ere the Great Western monopolize it, (by the establishment of some coke manufactory, we presume). His hearers took the hint, and next day called a meeting and opened a share-list with 500*l.* on the spot.——A company, too, was lately initiatived at Tottenham and Edmonton to purchase the private works recently erected there, for the purpose of pushing the supplies into private houses, and meeting the increasing demand which cannot be supplied by the metropolitan establishments,—from a deficiency, it must be, either in quantity, quality, or price, but most probably from a threefold deficiency in all these essential respects. The projected company was gone into with the anticipation of realizing 6 per cent. the first year, and "greatly increased dividends in future." We have not yet heard how it further progresses.——The gas monopoly in Marylebone is likely to be very soon broken up, so far, at least, by the introduction of the pipes of the Kensal-green New Western establishment, which is expected to give an article 75 per cent. stronger and purer at the present price. The subject was the other day discussed in the vestry's committee, and resolutions in favour of a trial of the new company passed.——In consequence of the important and significant movement of certain manufacturing and other firms towards the manufacture of their own gas, the Lincoln Gas Company were again lately urged by some of their own shareholders to authorize "a still further reduction of the price, as a boon to the consumer, and a matter of policy, *to prevent private enterprize in the manufacture.*" The shareholders, however, were too inert, at the moment at least, for such a motion, but "there cannot be a doubt," as the *Lincolnshire Times* lately remarked, "that little time will now elapse before the company will [be compelled to] reduce the price from 7*s.* 6*d.* to 5*s.* per thousand," and the demand will then, it is believed, be greatly augmented.——Dissatisfaction, however, is working its own remedy elsewhere than in Lincoln alone. The Winchester consumers cannot see why they should be called upon to pay the enormous price of 11*s.*, while at Southampton the charge is now reduced to 6*s.*, and this is likely hence to be 'the winter of their discontent,' which will be followed by a summer of comparative satisfaction.——The Romsey gas consumers have been grumbling, and aggrieved, not only at the enormity of the price of their gas—12*s.* 6*d.* per 1,000—but at being obliged to pay more for it than the commissioners for lighting the town do. The commissioners have *power*, probably: they are united as an association, and might soon erect gas works for themselves, as other companies are doing and threatening to do. The shareholders at Romsey, however, were alarmed at even the shadow of a gas league which the one common grumble evinced, and accordingly came seriously to consider of the prudence of slackening the rein by a reduction of 3*s.* 6*d.* per 1,000, leaving 9*s.*, which the hopeless disunited are inclined to regard as a 'reasonable charge!'——The 'British' Branch Company have been feasting 'several of the *large* consumers' at Norwich!—as if the Norwich public were not the largest consumers in the town. Mr. Wilkin, who presided, also intimated to the large consumers a reduction of price from 6*s.* 8*d.* to 5*s.* 10*d.*, and assured them that "this reduction was a voluntary act on the part of the directors, and did not arise from any pressure from without"—recent threats and doings of 'large consumers,' a little to the west-north-west of Norwich, and nearer home, notwithstanding. The 'British,' however, as times go, must be allowed the credit of setting a fair example to other 'British' gasholders, in further intimating, that if their present reduction lead to a further diffusion, that diffusion will lead to a still further reduction, as their only desire is 'to realize a fair and legitimate profit.' The sooner a multitude of other companies *profit* by this example the better for themselves as well as for consumers—large and small.——On account of the high price of the article in Barnsley, says the *Doncaster Gazette*, the shopkeepers, with a view to abridge their gas bills, have, one and all, taken the pruning-knife and lopped off two hours' burning from their lights.——At Doncaster itself, by the way, the price has been reduced from 6*s.* 8*d.* to 5*s.* 10*d.* Every little helps towards what seems to be earnestly yearned for at Doncaster as well as every where else, viz., "the introduction of gas into dwelling-houses and other places which have not hitherto enjoyed the advantages of a safe, cheap, and brilliant light." For public companies at Doncaster,—in whom even the Doncaster Gas Company seem still to stand in salutary awe—the price charged is only 3*s.* 0½*d.* per 1,000 feet. But why not regard the *public* itself as a *large company*, and charge them all the same? *It is indeed a company—a league alone—that will do.* Why, the average prices charged to public companies almost everywhere else, significantly point in the same direction, when contrasted with the heavier charges wrung from the less formidable, because not yet associated, public itself. We shall take another opportunity of enlarging a little further on this point, but, in the meantime, we may just allow our gas-consuming readers to ruminate a little on the hint already given—especially when reinforced, in the meantime, by such facts as these (of which, also, more anon), viz.—that the average price paid by public companies at Bradford, Barnsley, Dewsbury, Halifax, Huddersfield, Leeds, Pontefract, Rotherham, Sheffield, Wakefield, &c., is very little more than that at Doncaster, namely, 3*s.* 3½*d.* per 1,000.——A new consumers' company, by the way, was some time ago determined on at Belper, where the price to 'private consumers' has been 9*s.* per 1,000 cubic feet. This is the way to convert *small* consumers into *large* ones, only they must feast themselves. We have not heard, however, what has been the result of this attempt to 'light the town of Belper in a more effective and less expensive manner than it is at present lighted.' Safer investments than *many* such projects must inevitably prove to be, in preparation for the coming 'general illumination,' cannot well be conceived.——There seems to be now no doubt of the staminal vitality—suspended, in the meantime, though it be—of those competitive measures that were brought before the Parliament which is now itself defunct. We specially allude to the Liverpool Consumers' Company, and that of the Southampton Consumers. As the *Albion* reminds its readers, the committee of the Guardian have already saved nearly 50,000*l.* per annum to the people of Liverpool—ay, while even greatly improving the *acknowledged* prospects of those very companies from whose pockets the 50,000*l.* per annum have been taken or withheld! The Guardian therefore OUGHT to LIVE. As for the Southampton consumers, they have already manifested unequivocal symptoms of a revival from the suspended animation of the interregnum, having now issued their notices of movement in the new Parliament.——A sort of small ferment has been excited by the Gas Committee at Walsall announcing that they would refuse to supply gas to any party not employing one particular gas-fitter for the erection and repair of their fittings, the interests of that favourite one being further supported by the equivocal compliment to all other gas-fitters, in Walsall or out of Walsall, understood, though not expressed, in the assurance that this determination was come to for the purpose of preventing the "loss and danger arising from the imperfect manner in which the work may be done by other parties." The consumers imagined that they ought to have been allowed the possession of some small discretion and judgment in a matter affecting their own interest and safety no less than that of the gas committee; and that they had a clear right to employ the cheapest and best gas-fitter that could be had. A motion was accordingly lately made in council, and carried by a majority of one, in recognition of the public right.——Of the progress of the gas movement elsewhere we have much more to add than what we can possibly find room for, but we may just briefly observe, in conclusion, that the old Brighton Gaslight and Coke Company have—some time ago indeed—reduced their price by meter from 7*s.* to 6*s.*; that gas works are about to be established at Morley, Staindrop, Brierley-hill, Alfreton (where they are already in progress indeed), and elsewhere, and that a successful experiment has been made at Hartlepool in lighting the lighthouse there,—the first on a large scale or of any great importance that has yet been lit with gas.

LONDON UNION-WORKHOUSE COMPETITION.

IN reply to the advertisements for designs for a workhouse, declaring "that the architect of the design which should be selected by the guardians as the most eligible for their purpose, should be engaged to superintend the execution of the same; that the architect of the design secondly selected should have a premium of 100*l.*; and the architect of the design thirdly selected should have a premium of 50*l.*,"—forty-three designs were sent in, two of which the committee appointed to examine them rejected, as "not being in accordance with the instructions." The received designs were then hung up in two rooms at the Auction Mart, and eleven of them were first selected. Ultimately, three were chosen from these by the committee—Nos. 7, 15, and 18, and their choice being ratified by the board, the authors of these were declared to be the successful candidates, in the following order:—1. Mr. Tress (No. 7, "*Vivo Spem*"?); 2. Mr. Daukes (No. 15, "*Humanitas*"!); and 3. Mr. Taylor (No. 18).

The decision has brought us at least a quire of MS., setting forth the whole matter in the strongest language as an unmitigated job, demanding the strictest inquiry. We have not yet seen the designs, having been refused admittance last week with such small courtesy as made us pity the poor paupers, and therefore cannot speak so loudly and so clearly as would otherwise be the case. We cannot hesitate to say, however, on the evidence before us, that the accommodation afforded by the plan selected for execution (No. 7), is quite inadequate, the classification defective, and the circumstances attending the selection suspicious. We earnestly entreat the guardians (some of whom, we know, condemn the decision entirely) to seek professional assistance in the examination, and to pause before they consummate an injustice.

WESTMINSTER COURT OF SEWERS.

A GENERAL court was held on Friday, the 19th inst., Capt. Bague in the chair.

Fever in Soho.—A letter was received from the inhabitants of Charles-street, Soho, in confirmation of one received at the last court, complaining that cesspools existed in the houses, of the most offensive description; that one death had taken place by typhus fever engendered thereby; and calling upon the court to extinguish the evil. The clerk of the works for the district (Mr. Webber) upon being called on for his opinion, said he examined the premises in question, and that cesspools certainly existed, but that there was a very efficient sewer in front of these very houses, if parties would only avail themselves of it. It was then agreed that notices should be served upon the owners of the premises, under the provisions of the new Act, calling upon them at once to drain the said houses into the public sewer.

The Drainage of Long Acre.—The court next proceeded to open tenders for the construction of 1,825 feet of sewer in Long Acre, which were as under:—

Yeoman	£1,112
Hill	1,022
J. and S. Williams	910
Robinson	894
Dethick	843
Humphreys & Thirst (accepted)	779

After which the following tenders were received for 1,130 feet of sewer in Newman-street, Oxford-street:—

J. F. Watson	£900
Yeoman	879
Hill	866
Radley and Rogers	850
C. Bell	840
J. and S. Williams	805
Robinson	795
Perkins	766
Humphreys and Thirst	739
Dethick (accepted)	723

The Expiring Commission.—The clerk repeated at this court the answer received by him from the Lord Chancellor's secretary in reference to the renewal of the commission: the particulars of this interview appeared in THE BUILDER of last week.

The chairman, on so important a matter, wished the opinion of the court:—Whether the answer of the Lord Chancellor's secretary, being a verbal one, could, in point of law, be received; and whether a written communication should not be obtained from the Lord Chancellor on the subject?

Mr. Willoughby said the court could not be appointed at the whim of the Lord Chancellor, as Acts of Parliament had declared that commissions of sewers should issue, and merely invested the Lord Chancellor for the time being with powers to nominate and appoint the commissioners; and these powers had been followed up, confirmed, and ratified. Something, too, he thought, was due to themselves, who had laboured for the benefit of the public, to know on what grounds they were to be deprived of the commission. He had himself for many years been honoured with the commission, and he knew that the large body of gentlemen had been appointed on public and not on private or personal grounds. The court had recently been invested with additional powers by Act of Parliament, and those additional powers had been granted with the concurrence of Government itself;—for to his knowledge Lord Morpeth had said, that if the Government were not in a position to carry their own measure, they should support the bill for extending the powers of this court. Was that the time, then, he asked, for reasons they did not know, to be struck out of the commission? It was due to this court that some means should be taken to draw the Lord Chancellor's attention to this circumstance,—that one Parliament had conferred additional powers, which were just being developed, and before the Parliament could meet again that they were to be deprived of that power. As a legal man, and having every respect for the high office of Lord Chancellor, he could not consent, after years of service on behalf of the public, to have his name struck out of the commission without having some reason why it was done. He submitted, that as their powers had been conferred by Parliament, they could not be taken away until Parliament in its wisdom should think proper to do so. The commissioner concluded by moving:—"That a deputation do wait upon the Lord High Chancellor, respectfully urging him, for the benefit of the public, to renew the commission."

Mr. Hawkes thought they had done quite enough already, and that it would be the most dignified course not to complain of not being re-appointed. As to what had been said of the court now sitting, and the slanders uttered against them at Gwydyr House, why had they not appointed some person to answer these slanders? Even their own surveyor had declared here and elsewhere that that court ought not to continue. He hoped the commission would not be renewed, for the commissioners were anxious to get the power they so long held and so long misused; and instead of going bowing and scraping it would be better for them at once to wind up their affairs and retire with something like dignity.

Other commissioners having spoken, the chairman put the motion, which was carried by a majority of 12 to 8.

Messrs. Alderman Johnson, E. Willoughby, T. L. Donaldson, France, and Allason, were chosen to form the deputation.

The Case of Mrs. Webb.—The solicitor reported that no declaration had been filed in the case of Mrs. Webb by Mr. Farlar; and in reference to this subject a letter was read from Mr. Farlar, protesting against the rates being used for defending Mrs Webb's case, and in which the terms "dishonourable," "dishonest," "ridiculous," "robbery," &c., were plentifully scattered. No order was made on it, and it was laid on the table.

Improvement of the Drainage of Westminster, Government Offices, &c.—The court next proceeded to consider the report of the surveyor on the drainage of the parishes of St. Margaret and St. John, Westminster, and the formation of a new sewer on the proposed line of Victoria-street, discharging itself into the river Thames at Richmond-terrace, and affording a complete drainage of the Government offices in Whitehall, Downing-street, &c. The expense is estimated at 5,000*l.* A letter was read from the Westminster Improvement Commissioners, stating that their works were at a stand, and must remain so until the proposed sewer was built.

After some discussion, a long conversation ensued on the propriety of 9-inch work for a sewer of such dimensions, and it was agreed, that if in the execution of it the surveyor should see any objection to it, he should make a special report to the court.

It was then resolved that the report and plan of the surveyor be adopted, and that the work be sanctioned as soon as the necessary estimates can be prepared.

The Sanatory Movement in Hammersmith and Fulham.—Mr. Bathurst laid before the court the following memorial from the parishes of Hammersmith and Fulham:—

"*To the Commissioners of Sewers for Westminster and Part of Middlesex.*

Board Room, Hammersmith, Nov. 18.

That this board having instituted an inquiry into the sanatory state of the parishes composing this union, and as to how far the health of the inhabitants may be affected by nuisances existing from, or caused by the want of sufficient drainage or sewerage, or otherwise, and having received the reports of their medical officers, and also reports from the respective boards of highways (which reports are of the most unfavourable nature), do deeply deplore the circumstances in which the parishes both of Hammersmith and Fulham are placed for want of effectual and sufficient sewerage and drainage; and the nuisances seriously affecting the health of the inhabitants, which exist from those causes, appear to this board to require immediate attention.

That a copy of this resolution, and of the reports on which it is founded, be transmitted to the Honourable the Commissioners of Sewers for the City and Liberty of Westminster, and their attention called to the subject, in the hope that they will provide an early and efficient remedy.

A. G. CHANCE, Clerk."

The commissioner, in support of the memorial, said this court could confer no greater favour than taking these parishes under their protection.

Mr. Crook, of Hammersmith, expressed his willingness to advance 1,000*l.* for this object, if the court would ensure him a return of his capital.

New Books.

Principles of the Mechanics of Machinery and Engineering. By JULIUS WEISBACH, Professor of Mechanics and Applied-Mathematics in the Royal Mining Academy of Freiberg. Vol. I. London: Hippolyte Baillière, Regent-street.

PROFESSOR WEISBACH has by this production rendered very essential service to the mechanical and engineering professions, and it is to be hoped that his labours will be duly appreciated, and that he will meet the reward to which he is so justly entitled by his merits as a mechanical engineer.

The book before us is a translation from the German, and we are led to infer, from the style and manner of the performance, that the spirit of the original has been well preserved. The work is divided into sections, and subdivided into chapters; and these chapters are again distributed into paragraphs, distinguished by numerals. This system of division and subdivision is convenient for reference, but it has always appeared to us as having a tendency to disfigure and confuse the page, at least when carried to excess, as we are somewhat apprehensive is the case in the present instance; and unless the numerals are so applied as to form a connected chain, the scheme had better be abandoned altogether.

The book opens with a section on *phoronomy* (the term is new to us), or the pure mathematical science of motion. This is a very important department of theoretical mechanics, and Professor Weisbach has done it ample justice: his definitions of the different kinds of motion are the best that we have seen; the examples are well chosen and appropriate, and the graphical representations quite to the purpose. Chapter I. treats of simple motion, and Chapter II. of compound motion, which completes the section.

The second section treats of mechanics, or the physical science of motion in general; it consists, like the former, of two chapters: the first chapter is devoted to the fundamental principles of mechanics, and the second to the mechanics of a material point. The division of forces, and the division of mechanics in the first chapter, is much to the point, but we cannot accord our approval of the attempt to introduce so many new terms, even although, in some instances, they may bear a more definite signification than those in general use. In the second chapter, the parallelogram of forces is very skilfully handled, as far as it goes; and the diagrams, with white lines on a dark ground, which are here introduced, are well executed, but we cannot say that we approve of the notation employed,—we mean the mode of representing the same kind of quantities by the same letter of the alphabet, with a number at the lower right-hand corner of it. This mode of distinction may answer very well in the diagrams themselves, but it is very apt to cause confusion in the analytical expressions.

The third section treats of the *statics of rigid bodies*; it is subdivided into six chapters, embracing the several topics which are peculiar to this department of mechanical science. The subject of each chapter is skilfully discussed, and in several of them we are presented with some new and interesting ideas. In the first chapter, which treats of the composition of *forces in a plane*, and of *forces in space*, the subject of the parallelogram of forces is rendered complete, and, under our author's management, it becomes a very seductive branch of practical science.

The doctrine of the centre of gravity, as treated in the second chapter, is quite to our taste; and the properties of Guldinus, there incidentally alluded to, have long been favourite subjects of investigation to ourselves, yet we cannot help thinking that, in consequence of their extensive application to the determination of the surfaces and contents of solids of revolution, a very useful independent work might be composed on the subject.

The third chapter is on the equilibrium of bodies rigidly connected and supported. This is a very interesting topic, and comprehends the doctrine of *pressure on an axis; equilibrium of forces about an axis*; the *theory of the lever; pressure of bodies on one another; stability, statical and dynamical; theory of the inclined plane; principle of virtual velocities*, and the *theory of the wedge*. Chapter IV. is on the *equilibrium of funicular machines*. This is a topic fraught with the most fruitful consequences: it embraces the doctrine of the *tension of cords*; the *principles of the catenary* and *suspension bridges*; the *theory of the pulley* and of the *wheel and axle*. These several subjects are treated by our author in a skilful manner; and the same remark will apply to the remaining part of the work,—for to analyse the whole would far exceed the limits which can be allowed in the pages of our journal.

Upon the whole, the work which has called forth these remarks is one of the most interesting to a moderately-informed mathematician that has been laid before us for some time; and we may safely term it a *scientific gem*.

PROJECTED WORKS.—Tenders have been called for by advertisement for the excavation of an open cutting and earthwork for driving a plant or level near Swansea; for deepening four wells at the Barracks, Winchester; and for constructing a new floating dock at Leith, with an extension of breakwaters, and the erection of a low-water pier and other works.

COMPETITION.—Designs for a workhouse for 300 inmates, on the six-class system, are advertised for by the York Union Guardians. Premium for approved design 30*l.*, or employment to carry out the design, as the guardians shall decide.

MIDDLESEX LUNATIC ASYLUM COMPETITION.—The decision is not yet made, but may be expected, we are told, in the beginning of next month.

TO CORRESPONDENTS.

"*J. S.*" (Vauxhall.)—We have an opportunity to give the invention a trial, if he is so disposed.

"*W. H.*"—Thanks.

"*H. A. M.*" will find much advantage from drawing from cast, friezes, foliage, &c.

"*T. S. D.*"—Further information is forthcoming. We shall be much pleased to hear from Mr. D.

"*S.*"—The Caxton Memorial seems to have "died the death."

"*J. T.*"—We should say it is a party-wall; but this would depend on the terms of the arrangement.

"*M. and C.*"—The inventor of the material in question does not at present give his name.

"*D.*" (Bath.)—Received. Further explanation is desirable.

"*J. S.*" will find mention of works on "Furniture" in our next number.

"*Fire-Proof Cement.*"—A correspondent wishes to know the best for stoves. Mr. Copeland (Lincoln's-inn-fields) has patented a cement of the sort.

"*Drilling Machines.*"—We refer our correspondents who asked for sources of further information on this subject to the present week's RAILWAY JOTTINGS.

Received.—"E. Davis," Mr. I. (Lewisham), "Peter Palette," "J. W.," "J. M." (Bridgewater), "An Architect and a Member of the Institute," "Regular Subscriber," "F. D.," "G. R. C.," "F. W. H.," "No 'Guardian.'"

Books Received.—"Transportation and Convict Discipline Considered:" by Mr. Zachary P. Pocock (Simmonds, Bucklersbury). "Fielder's Patent for Improvements in the Construction of Iron Beams or Girders."

"*Books, Prices, and Addresses.*"—We have not time to point out books or find addresses.